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POPULATION

POPULATION

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PREFACE

A BELIEF in the material progress of mankind is not old. During the greater part of history such a belief was neither compatible with experience nor encouraged by religion. It is doubtful whether, taking one century with another, there was much variation in the lot of the unskilled labourer at the centres of civilisation in the two thousand years from the Greece of Solon to the England of Charles II or the France of Louis XIV. Paganism placed the Golden Age behind us ; Christianity raised Heaven above us ; and anyone, before the middle of the eighteenth century, who had expected a progressive improvement in material welfare here, as a result of the division of labour, the discoveries of science and the boundless fecundity of the species, would have been thought very eccentric.

In the eighteenth century, for obscure reasons which economic historians have not yet sufficiently explored, material progress commenced over wide areas in a decided and cumulative fashion not previously experienced. Philosophers were ready with an appropriate superstition, and before the century was out Priestley's view was becoming fashionable, that, by the further division of labour,—" Nature, including both its materials and its laws, will be more at our command ;

men will make their situation in this world abundantly more easy and comfortable; they will prolong their existence in it and will grow daily more happy."

It was against the philosophers of this school that Malthus directed his Essay. Its arguments impressed his reasonable contemporaries, and the interruption to progress by the Napoleonic wars supplied a favourable atmosphere. But as the nineteenth century proceeded, the tendency to material progress reasserted itself. Malthus was forgotten or discredited. The cloud was lifted; the classical Economists dethroned; and the opinions of the Vicar of Wakefield, who "was ever of opinion that the honest man who married and brought up a large family did more service than he who continued single and only talked of population," and of Adam Smith, who held that "the most decisive mark of the prosperity of any country is the increase of the number of its inhabitants," almost recovered their sway.

Nevertheless, the interruption to prosperity by the war, corresponding to the similar interruption a hundred years before, has again encouraged an atmosphere of doubt; and there are some who have a care. The most interesting question in the world (of those at least to which time will bring us an answer) is whether, after a short interval of recovery, material progress will be resumed, or whether, on the other hand, the magnificent episode of the nineteenth century is over.

In this volume of the *Cambridge Economic Handbooks* Mr. Harold Wright summarises the data, and outlines the main features of the Problem of Population. It is no part of the purpose of this Series to present ready-made conclusions. Our object is to aid and stimulate

study. The topic of this particular volume is one about which it is difficult, for anyone who has given much thought to it, not to feel strongly. But Mr. Wright has avoided propagandism and has been concerned to display in a calm spirit the extraordinary interest, difficulty and importance of his subject, rather than to advocate any definite policies. His object will have been accomplished if he can do something to direct the thoughts of a few more students to what is going to be not merely an economist's problem, but, in the near future, the greatest of all social questions,—a question which will arouse some of the deepest instincts and emotions of men, and about which feeling may run as passionately as in earlier struggles between religions. A great transition in human history will have begun when civilised man endeavours to assume conscious control in his own hands, away from the blind instinct of mere predominant survival.

J. M. KEYNES.

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POPULATION

CHAPTER I

EARLY POPULATION THEORIES

"Is there anything whereof it may be said, See, this is new? It hath been already of old time, which was before us."

Ecclesiastes i. 10.

§ 1. *Introductory.* "The view once widely held that the principle of population must inevitably keep the mass of the people close to the verge of the bare means of subsistence was no statement of a desirable ideal. It was a nightmare; a nightmare none the less, though it may haunt us yet." So wrote Mr. Henderson in the first volume of this series; and it is the purpose of this, the fifth volume, to explain what is meant by "the principle of population"; to examine its validity as a universal economic law, and to enquire how far the truth in this matter is a menace to the progress of mankind; a nightmare which must haunt us yet.

Economists have often been accused of being too little guided by the actual experience of mankind. Sometimes, no doubt, they have been guilty of this

fault. At other times, however, the tendency has been to err in the other direction and to mistake the peculiar conditions of a particular period in the evolution of human society for the permanent and inevitable results of the working of economic laws. This latter tendency has always been very much in evidence with regard to questions about population. When small communities have sought to maintain exclusive possession of large and fertile lands, their learned men have naturally taught them that an increasing population was an unmixed blessing, since it provided more hands to till the soil and more soldiers to defend the fields. When, on the other hand, a community found itself confined to a certain definite area, and that area was well supplied with human beings, a wise man would arise and point out that the means of subsistence were limited and that a further increase in the population must inevitably involve hunger and misery, unless an outlet could be found in other lands. Both doctrines were perfectly sound in their application to the circumstances of the particular peoples to whom they were addressed; but the doctrines were frequently couched in general terms, as though they must necessarily apply to all nations at all times, which they certainly do not. Even T. R. Malthus, whose essay on *The Principle of Population*, first published in 1798, still holds the field as the classic exposition of this subject, owed much of his early fame to the special economic circumstances of Great Britain in the early years of the nineteenth century, and suffered a partial eclipse owing to changes which did not in any way invalidate his main argument.

§ 2. *Greek and Roman Population Theories.* The ancient Greeks characteristically approached the population question from the point of view of the ideal City State. They made up their minds first as to the number of citizens that would produce the most satisfactory political and social unit, and then took steps to keep the population up to the desired level and to prevent it from increasing beyond it. They took account of the quality as well as of the number of citizens, and endeavoured to eliminate the unfit from their societies. In Sparta there seems to have been little fear of over-population, except in regard to the slaves, whose numbers were kept in check by such devices as infanticide. Frequent wars took their toll of young freemen, and created an urgent demand for more. Thus, in Sparta, the State regulations respecting marriage and procreation were mainly directed towards a high birth-rate of healthy children. Every Spartan was expected to marry for the good of the State. Bachelors were subjected to social indignities as well as to legal and political disabilities. Marriages were supervised with a view to the production of children sound in body and mind, and the fathers of three or more sons were publicly rewarded.

In Athens, the regulation of marriage was less rigid than in Sparta. There, too, laws existed against celibacy; but in times of peace these were not enforced, and late marriages were advocated. The Athenian remedy for over-population was emigration, but infanticide was also a recognised custom. Malthus remarks that "when Solon permitted the exposing of children, it is probable that he only gave the sanction

of law to a custom already prevalent"; adding with characteristic shrewdness:

"In this permission he had without doubt two ends in view. First, that which is most obvious, the prevention of such an excessive population as would cause universal poverty and discontent; and, secondly, that of keeping the population up to the level of what the territory could support, by removing the terrors of too numerous a family and consequently the principal obstacle to marriage."

In addition to these two motives, the Greeks were inclined to look favourably upon infanticide as a eugenic device; for weakly or deformed children were exposed in Sparta by order of the State, a practice which Plato and Aristotle both approved.

Malthus was clearly justified in saying that infanticide was frequently adopted among primitive peoples as a means of keeping the population within the means of subsistence. In Polynesia, for instance, the islands being small though the climate is favourable to the production of food, the custom was generally observed. In the Hawaiian Islands all children after the third or fourth were strangled or buried alive. At Tahiti, fathers had the right (and used it) of suffocating their newly born children. The Areois, in the Society Islands, imposed infanticide upon the women members by oath. In fact, although a religious sanction is often given to the slaughter of infants among savage tribes, this practice or others restricting increase seem to be generally prevalent among those peoples who have reason to fear that their food supply may prove insufficient for their support, while in some countries infants are destroyed in times of scarcity only. It is

therefore reasonable to suppose that some fear of over-population played a part in originating this custom among the ancient Greeks.

Infanticide was prevalent among the Romans also, but it is improbable that the practice was encouraged by their rulers. As a conquering race they were always obsessed with the need for soldiers and colonists. Their legislation respecting marriage and parenthood was therefore directed towards an increase in population. As in Sparta, rewards were given to the fathers of families and penalties imposed upon bachelors. Plutarch says of Camillus that "as the wars had made many widows, he obliged such of the men as lived single, partly by persuasion and partly by threatening them with fines, to marry the widows." Whether any Roman Weller stood out against this terrifying edict is not recorded! In the early days of the Empire, the population question appears to have caused considerable anxiety. Augustus resorted to elaborate legislation. He enacted that men and women must be married and have children before the men were twenty-five and women twenty. Those who disobeyed this law by remaining unmarried were disqualified from becoming heirs or receiving legacies. Those who married but had no children could receive only half of any property left to them, and could bequeath only one-tenth of their property to their widows. On the other hand, honours and privileges were bestowed upon prolific parents.

The object of this legislation seems, however, to have been the preservation of the patrician families rather than the increase of the numbers of the whole people.

to a neighbouring continent, where . . . they fix a colony. . . . Such care is taken of the soil that it becomes fruitful enough to supply provisions for all, though it might otherwise be too narrow and barren."

If the influence of Plato, or his own insight, led Sir Thomas More to regard excessive population as an evil, no such calculation was sanctioned by his contemporary, Luther, whose views on this subject had a profound influence on the Protestant world, an influence which is not yet exhausted.

"God," said Luther, "has shown how sufficiently He cares for us, when He created heaven and earth, all animals and plants, before He created man. He shows us thus that He will always provide food and shelter sufficient for our needs. It is only necessary that we work and do not remain idle; we shall assuredly be both clothed and fed. . . . From all this we draw the conclusion that whoever finds himself unfitted to remain chaste should make arrangements betimes and get some work and then dare, in God's name, to enter into matrimony. A youth should marry not later than his twentieth year, and a maiden when she is between fifteen and eighteen years old. Then they should remain upright and serious and let God provide the way and means by which their children shall be nourished."

This pronouncement has shared the fate of many another striking utterance. It has been stripped of its qualifying phrases and used as a substitute for common sense. How many careless parents have cried, "Let God provide!" without first taking the precaution of "making arrangements betimes and getting some work," or even remembering to "remain upright and serious."

English writers of the early seventeenth century, seeing destitution and poverty around them, regarded over-population as a very real thing and a potent cause of international strife. Thus, Sir Walter Raleigh in his *Discourse of War in General*, said :

" When any country is overlaid by the multitude which live upon it, there is a natural necessity compelling it to disburden itself and lay the load upon others, by right or wrong, for (to omit the danger of pestilence, often visiting them that live in throngs) there is no misery that urgeth men so violently unto desperate courses and contempt of death as the torments and threats of famine. Wherefore, the war that is grounded on general remediless necessity, may be termed the general and remediless or necessary war."

Elsewhere he wrote that the earth would not only be full, but overflowing with human beings, were it not for the effect of hunger, pestilence, crime and war, and of abstinence and artificial sterility.

Bacon and other writers of the period also express the view that wars are caused by the pressure of population on the means of subsistence.

When we come to the next great period in economic history, however, we find almost every writer on the subject dwelling upon the advantages of large and growing populations. The growth of large States, increasing in power and the love of power, developing an industrial and commercial life which made the maintenance of a larger population possible, and indulging in wars which required a constant supply of wealth and life to feed them, led inevitably to the revival of the Roman view that marriage and pro-

creation were duties which the citizen owed to the State. This view was emphasized by the fact that the Thirty Years War, in which practically the whole of Europe had been involved during the early part of the seventeenth century, had depleted the population to an appalling extent. In Bohemia it is said that only about 6000 villages out of 35,000 escaped destruction; Moravia and Silesia suffered a similar fate; Bavaria, Franconia and Swabia were desolated by famine and disease, while the rest of Germany and Austria fared little better. "During more than a generation after the conclusion of the war a full third of the land in northern Germany was left uncultivated. Cattle and sheep diminished to an extraordinary extent, and many once fertile districts became forests inhabited by wolves and other savage beasts."[1]

In the course of this war the population of the Empire is believed to have diminished by at least two-thirds—from over sixteen to under six millions. In the Lower Palatinate only one-tenth and in Württemberg only one-sixth survived.

Under these circumstances it is not surprising that Mr. Stangeland should find in his study of German literature on the subject that "the opinions on population from the end of the Thirty Years War to the beginning of the eighteenth century were unanimously favourable to the greatest possible increase."[2] Thus Leibnitz thought that the State should encourage marriage because "the true power of a kingdom consists in the number of men. Where there are men, there is

[1] *Cambridge Modern History*, Vol. IV, p. 419.

[2] *Pre-Malthusian Doctrines of Population*, by C. E. Stangeland.

substance and strength. Where men are most diligent and laborious and saving of their goods, there all are safest; and manufacturing especially is to be considered the most useful occupation in accomplishing this result." Christian Wolff (1679–1754), a disciple of Leibnitz, who is said to have been one of the first to "teach philosophy to speak German," expressed a crudely militarist point of view about population problems. Power, he said, consists in money, in the army which a state is able to keep, and in the greatest amount of employment; but above all in a rich and populous state; but "wealth is superior to numbers of subjects; for where there is enough money an army can always be maintained, and when necessary foreign mercenaries can be hired to defend the country. If there is no money with which to support an army, a multitude of people is of small service."

§ 5. *The Introduction of Vital Statistics.* Johann Peter Süssmilch (1707–1767), one of Frederick the Great's military chaplains, was the first writer to deduce a principle of population from the study of vital statistics which had been collected by various English and German writers during the latter half of the seventeenth century. His investigation made him optimistic concerning both the desirability and the possibility of increase. Improvements in the methods of production, especially in agriculture, would, he thought, greatly increase the food supply. With more intensive cultivation, the yield of land could be increased an hundredfold. God regulated population according to the supplies He had given. It was the duty of statesmen

to encourage population, because it was the means of happiness, security, power and wealth.

Süssmilch detected four great natural checks to the increase of mankind :

(*a*) Pestilence, which often carried off half the population, not only of cities, but of whole provinces.
(*b*) War, "a real monster, a disgraceful blot on reason and humanity, and especially on Christianity," which robbed the State of many of its best citizens and also diminished the means of subsistence.
(*c*) Famine.
(*d*) Earthquakes and floods.

This notable contribution towards a true theory of population was rendered possible by the *Political Arithmetic* of Graunt (1620–1674) and Petty (1623–1687), who first attempted to collect statistics of births, deaths and marriages in the city of London. Gregory King, Lancaster Herald, whom Macaulay describes as "a political arithmetician of great acuteness and judgment," carried this work a step further when he compiled his *Natural and Political Observations and Conclusions upon the State and Condition of England*, 1696. Basing his calculations mainly upon the number of houses returned in 1690 by the officers who made the last collection of the hearth money, he arrived at the conclusion that the population of England was nearly five millions and a half, an estimate that has since received confirmation from independent sources. From this figure and the information he collected about the birth and death-rates, King made the following ingenious deductions, which are worth reproducing, both

for their intrinsic interest and as an indication of the pitfalls of political arithmetic :

" That, Anno 1260, or about 200 years after the Norman Conquest, the kingdom had 2,750,000 people, or half the present number ; so that the people of England have doubled in about 435 years last past ;

" That in probability the next doubling of the people of England will be in about 600 years to come, or by the year of our Lord 2300 ; at which time it will have 11 millions of people ; but that the next doubling after that will not be (in all probability) in less than 1200 or 1300 years more, or by the year of our Lord 3500 or 3600 ; at which time the kingdom will have 22 millions of souls, or four times its present number, in case the world should last so long ;

" Now, the kingdom containing but 39 millions of acres, it will then have less than two acres to each head, and consequently will not then be capable of any further increase.

. . . " Whereby it appears that the increase of the kingdom being 880,000 people in the last 100 years, and 920,000 in the next succeeding 100 years, the increase at this time is about 9000 souls per annum. But, whereas the yearly burials of the kingdom are about 1 in 32, or 170,000 souls ; and the yearly births 1 in 28, or 190,000 souls,

" Whereby the yearly increase should be 20,000 souls ;

" It is to be noted,

	per annum.
1. That the allowance for plagues and great mortalities comes to, at a medium . .	4000
2. Foreign or civil wars, at a medium . .	3500
3. The sea, constantly employing about 40,000, precipitates the death of about . .	2500
4. The plantations (over and above the accession of foreigners) carry away . .	1000
In all	11,000
Whereby the neat annual increase is but . .	9000
In all	20,000"

It will be seen that, if he was rather rash in his speculations, Gregory King gave us some useful statistics for comparison with more recent times. We shall return to these in a later chapter, devoting the rest of this to a glance at eighteenth-century population theories and the controversy which provoked Malthus to write his essay in 1798.

§ 6. *The Forerunners of Malthus.* Montesquieu made some shrewd observations on our subject in the twenty-third book of *L'Esprit des Lois*, from which the following are extracted :

"The females of brutes have an almost constant fecundity ; but in the human species, the manner of thinking, the character, the passions, the humour, the caprice, the idea of preserving beauty, the pain of child-bearing and the fatigue of a too numerous family obstruct propagation in a thousand different ways."

On the other hand :

"Wherever a place is found in which two persons can live commodiously, there they enter into marriage. Nature has a sufficient propensity to it, when unrestrained by the difficulty of subsistence. . . .

"A rising people increase and multiply extremely. This is because with them it would be a great inconvenience to live in celibacy and not to have many children ; the contrary of which is the case when a nation is formed."

The possibility of over-population was clearly indicated by Montesquieu in the following passage :

"There are countries in which nature does all ; the legislator then has nothing to do. What need is there of inducing men by laws to propagation when a fruitful

climate yields a sufficient number of inhabitants? Sometimes the climate is more favourable than the soil; the people multiply and are destroyed by famine; this is the case in China. Hence a father sells his daughter and exposes his children."

The Physiocrats, concentrating their attention upon the means by which the abject poverty of the French peasants could be alleviated, naturally rejected the "more the merrier" doctrine which the courtiers of ambitious monarchs had as naturally adopted. In the latter half of the eighteenth century, therefore, the French economists were generally inclined to emphasize the dependence of the population upon the food supply, and to point out that improvements in the methods of agriculture must necessarily precede any healthy increase in the numbers of the people.

This point of view was shared by various writers in Italy and Germany, but seems to have made so little impression in England that it came with the shock of novelty from the pen of Malthus. America was in advance of England in this respect, for Benjamin Franklin, who was much influenced by the Physiocrats, published in 1751 his short *Observations concerning the Increase of Mankind and the Peopling of Countries*, in which some fundamental principles were clearly expounded. Europe, he said, was almost fully peopled and could therefore increase but little and slowly, but in America land was so cheap and plentiful that a labourer could in a short time accumulate enough to support and provide for a family. Therefore "if it be reckoned there [in Europe] that there is but one marriage per annum among one hundred persons,

perhaps we may reckon two; and if in Europe they have four births to a marriage (many of their marriages being late) we may reckon eight, of which, if one-half grow up, and our marriages are made, reckoning one with another, at twenty years of age, our people must at least be doubled every twenty years." "There is no bound," said Franklin, "to the prolific nature of plants or animals, but what is made by their crowding and interfering with each other's means of subsistence. Was the face of the earth vacant of other plants, it might be gradually sowed with one kind only, as, for instance, with fennel; and were it empty of other inhabitants, it might in a few ages be replenished from one nation only, as, for instance, with Englishmen."

Not more than eighty thousand Englishmen had been taken to America, but by natural increase they amounted to more than a million in the middle of the eighteenth century. By doubling every twenty-five years—a moderate estimate, Franklin thought, of the rate of increase—this million would in another century result in a greater number of Englishmen in America than in the mother country. "What an accession of power to the British Empire by sea as well as by land!"

English writers were engaged at this time in a learned controversy concerning the relative density of population in ancient and modern times. Dr. Robert Wallace maintained the "superior populousness of antiquity" in a work published in 1753. David Hume replied to this in a *Discourse concerning the populousness of Antient Nations*. Wallace rejoined in an appendix to his own book, but, according to M'Culloch, though he "succeeded in pointing out a few errors in Hume's

statements, which were rectified in subsequent editions of the essay, he wholly failed to shake its foundations, or to prove in opposition to Hume that Europe was more populous in ancient than in modern times."

Other writers also took part in this discussion, and although the point at issue appears to be one of purely academic interest, it was mainly from these writings of Hume and Wallace that Malthus deduced his principle of population.

In 1776 occurred the revolution in economic thought occasioned by the publication of *The Wealth of Nations.* Adam Smith did not deal systematically with population problems, but his references to them are very suggestive, and there is no doubt that he, too, helped to inspire Malthus. In his chapter on the wages of labour, he says:

"It is not the actual greatness of national wealth, but its continual increase, which occasions a rise in the wages of labour. . . . The most decisive mark of the prosperity of any country is the increase of the number of its inhabitants. In Great Britain and most other European countries they are not supposed to double in less than five hundred years. In the British colonies in North America it has been found that they double in twenty or five-and-twenty years. Nor in the present times is this increase principally owing to the continual importation of new inhabitants, but to the great multiplication of the species. Those who live to an old age, it is said, frequently see there from fifty to a hundred, and sometimes many more, descendants from their own body. . . .

"Poverty, though it no doubt discourages, does not always prevent marriage. It seems even to be favourable to generation. A half-starved Highland woman frequently bears more than twenty children, while a pampered fine

lady is often incapable of bearing any, and is generally exhausted by two or three. . . .

"But poverty, though it does not prevent the generation, is extremely unfavourable to the rearing of children. The tender plant is produced; but in so cold a soil, and so severe a climate, soon withers and dies. It is not uncommon, I have been frequently told, in the Highlands of Scotland, for a mother who has borne twenty children not to have two alive. . . .

"Every species of animals naturally multiplies in proportion to the means of their subsistence, and no species can ever multiply beyond it. But in civilised society it is only among the inferior ranks of people that the scantiness of subsistence can set limits to the further multiplication of the human species; and it can do so in no other way than by destroying a great part of the children which their fruitful marriages produce."

In discussing the rent of land, Adam Smith observes that:

"Countries are populous, not in proportion to the number of people whom their produce can clothe and lodge, but in proportion to that of those whom it can feed. When food is provided, it is easy to find the necessary clothing and lodging. But though these are at hand, it may often be difficult to find food. . . .

"But when, by the improvement and cultivation of land, the labour of one family can provide food for two, the labour of half the society becomes sufficient to provide food for the whole. The other half, therefore, or at least the greater part of them, can be employed in providing other things, or in satisfying the other wants and fancies of mankind."

If Hume, Wallace and Adam Smith supplied Malthus with the materials from which he evolved his essay, William Godwin, the father-in-law of Shelley, performed

the equally important service of provoking him to write it. Godwin was a philosophical Radical, whose great work on political science, *The Inquiry concerning Political Justice, and its Influence on General Virtue and Happiness*, had a considerable influence upon the advanced politicians of his day. The French Revolution, the ideas which caused it and the ideas which were caused by it, had produced a school of optimism that was entirely new. A belief in progress, in the practicability of transforming men into angels and the world into a paradise, spread rapidly from France to England. Those who resisted the new idea seemed to do so because they clung to old privileges and abuses rather than through honest doubt. Wisdom and enlightenment were apparently on the side of the Radicals. Godwin was a disciple of Condorcet and believed in the perfectibility of man. The characters of men were blanks, he held, which their external circumstances and, above all, political institutions, filled in. Government was a necessary evil, perpetuated " by the infantine and uninstructed confidence of the many." Private property in the labour of others was unjust; the goal must be complete equality of conditions.

This belief in equality and perfectibility brought Godwin, as it had brought Condorcet, to consider whether the pressure of population upon the means of subsistence might not prove an insurmountable obstacle. He rashly answered with the conjecture that passion between the sexes may one day be extinguished, and that, anyway, " to reason thus is to foresee difficulties at a great distance. Three-fourths of the habitable globe is now uncultivated. The parts already cultivated

are capable of immeasurable improvement. Myriads of centuries of still increasing population may pass away, and the earth be still found sufficient for the subsistence of its inhabitants."

This utterance sealed the fate of William Godwin. "Malthus," wrote Sydney Smith, a few years later, "took the trouble of refuting him, and we hear no more of Mr. Godwin."

An account of the restrictive practices of primitive communities is given in *The Population Problem*, by A. M. Carr-Saunders.

Early population theories are collected and summarised in *Pre-Malthusian Doctrines of Population*, by C. E. Stangeland.

CHAPTER II

MALTHUS

" When goods increase, they are increased that eat them."
Ecclesiastes v. 11.

§ 1. *An Essay on the Principle of Population.* Thomas Robert Malthus was the son of an English country gentleman who had been the friend and executor of Rousseau and held advanced political opinions. Godwin's utopian communism inspired the elder Malthus with all the enthusiasm that a kindly man can feel for a doctrine which promises untold happiness to future generations without in the least interfering with his own present comfort. The son, however, though he was not lacking in sympathy for the ideals which accompanied the French Revolution, had not, he said, " acquired that command over his understanding, which would enable him to believe what he wishes, without evidence, or to refuse his assent to what might be unpleasing, when accompanied with evidence." There was thus a difference in point of view between the father and the son which led to endless arguments, or perhaps to the repetition of one unending argument in various disguises. The publication by William Godwin of a book called *The Enquirer* supplied fresh fuel to the fire, and the debate blazed up, in 1797, so that Malthus

found it necessary to resort to pen and ink in order to state his thoughts in a clearer manner than he could do in conversation. "But as the subject opened upon him, some ideas occurred which he did not recollect to have met with before; and as he conceived that even the least light, on a topic so generally interesting, might be received with candour, he determined to put his thoughts in a form for publication."[1]

The result of this determination was *An Essay on the Principle of Population as it affects the future improvement of society, with remarks on the speculations of Mr. Godwin, M. Condorcet and other writers*, published anonymously in 1798. The book had a splendid reception. Within five years, more than twenty replies to it had appeared in print, and the matter had been fully argued in periodicals and parliamentary speeches. Pitt dropped his Bill to amend the Poor Law in deference to the objections of "those whose opinions he was bound to respect," meaning Bentham and Malthus. In short, Malthus found himself in the centre of a tremendous controversy, and he determined to go more deeply into the subject, in order to support his argument by a formidable array of illustrations, drawn from "the best authenticated accounts that we have of the state of other countries." Thus the second edition of the Essay, published in 1803, differed in many respects from the first edition. The essence of the argument remained unchanged, except in one respect, which will be mentioned later, but it was very differently dressed. The version published in 1798 was a *tour de force*, full of striking metaphors and original thought;

[1] Malthus. Preface to first edition of the Essay.

the later version was a scientific treatise, four times the length, infinitely duller, and "one of the most crushing answers that patient and hard-working science has ever given to the reckless assertions of its adversaries."[1] The root of the matter will be found in the first two chapters of the Essay, which everyone should read for himself.

§ 2. *The Malthusian Argument.* The argument may be summarised as follows:

[2] "Through the animal and vegetable kingdoms Nature has scattered the seeds of life abroad with the most profuse and liberal hand; but has been comparatively sparing in the room and nourishment necessary to rear them. . . . The race of plants and the race of animals shrink under this great restrictive law; and man cannot by any efforts of reason escape from it." Thus, population has a constant tendency to increase beyond the means of subsistence. If the supply of food were unlimited, the number of human beings would double in less than twenty-five years (as the population of North America had actually done apart from immigration, for a century and a half), and go on doubling itself four times in each century, or in other words, increase in a geometrical ratio. On the other hand, the produce of this island could hardly be doubled in the next twenty-five years and it certainly could not be quadrupled in fifty years. "Let us suppose that the yearly additions which might be made to the former produce, instead of decreasing, which they certainly

[1] Marshall, *The Economics of Industry*, 1879, p. 30.

[2] The passages in inverted commas are quoted verbatim from Malthus.

would do, were to remain the same; and that the produce of this island might be increased every twenty-five years by a quantity equal to what it at present produces. The most enthusiastic speculator cannot suppose a greater increase than this. In a few centuries it would make every acre of land in the island like a garden." It is clear, then, that "the means of subsistence . . . could not possibly be made to increase faster than in an arithmetical ratio. . . .

"The necessary effects of these two different rates of increase when brought together will be very striking. . . ." Taking the whole earth, and thereby, of course, excluding emigration, "the human species would increase as the numbers 1, 2, 4, 8, 16, 32, 64, 128, 256, and subsistence as 1, 2, 3, 4, 5, 6, 7, 8, 9. In two centuries the population would be to the means of subsistence as 256 to 9; in three centuries as 4096 to 13, and in two thousand years the difference would be almost incalculable.

"In this supposition no limits whatever are placed to the produce of the earth. It may increase for ever and be greater than any assignable quantity; yet still the power of population being in every period so much superior, the increase of the human species can only be kept down to the level of the means of subsistence by the constant operation of the strong law of necessity, acting as a check upon the greater power.

"The ultimate check to population appears then to be a want of food, arising necessarily from the different ratios according to which population and food increase. But this ultimate check is never the immediate check, except in cases of actual famine.

"The immediate check may be stated to consist in all those customs, and all those diseases, which seem to be generated by a scarcity of the means of subsistence; and all those causes, independent of this scarcity, whether of a moral or physical nature, which tend prematurely to weaken and destroy the human frame.

"These checks to population, which are constantly operating with more or less force in every society . . . may be classed under two general heads—the preventive and the positive checks.

"The preventive check, as far as it is voluntary, is peculiar to man." Unlike plants and animals, man is apt to consider whether he will be able to support his offspring before he brings them into the world. "In a state of equality, if such can exist, this would be the simple question. In the present state of society, other considerations occur. Will he not lower his rank in life, and be obliged to give up in great measure his former habits? . . . Will he not at any rate subject himself to greater difficulties and more severe labour, than in his single state? Will he not be unable to transmit to his children the same advantages of education and improvement that he had himself possessed?" May he not even be reduced to poverty "and obliged to the sparing hand of Charity for support?

"These considerations are calculated to prevent, and certainly do prevent, a great number of persons in all civilized nations from pursuing the dictate of nature in an early attachment to one woman. If this restraint do not produce vice, it is undoubtedly the least evil that can arise from the principle of population. . . .

When this restraint produces vice, the evils which follow are but too conspicuous. . . .

"The positive checks to population include . . . all unwholesome occupations, severe labour and exposure to the seasons, extreme poverty, bad nursing of children, great towns, excesses of all kinds, the whole train of common diseases and epidemics, wars, plague and famine. . . ."

These checks to population, both preventive and positive, are "all resolvable into moral restraint, vice and misery." (The addition of "moral restraint" to the two other factors of "vice" and "misery" constituted the one important change in the argument of the essay when it developed into the weighty second edition. It transformed the "principle of population" from an inexorable decree of unending misery for the human race into a danger which man could avoid altogether by the exercise of a proper sense of his responsibility for his actions.)

"Of the preventive checks, the restraint from marriage which is not followed by irregular gratifications may properly be termed moral restraint. . . . Of the positive checks, those which appear to arise unavoidably from the laws of nature may be called exclusively misery; and those which we obviously bring upon ourselves, such as wars, excesses and many others which it would be in our power to avoid, are of a mixed nature. They are brought upon us by vice, and their consequences are misery. . . .

"The preventive and positive checks must vary inversely as each other; that is, in countries either naturally unhealthy or subject to a great mortality,

from whatever cause it may arise, the preventive check will prevail very little. In those countries, on the contrary, which are naturally healthy, and where the preventive check is found to prevail with considerable force, the positive check will prevail very little, or the mortality be very small.

"In every country some of these checks are in constant operation, yet . . . there are few states in which there is not a constant effort in the population to increase beyond the means of subsistence," which "tends to subject the lower classes of society to distress, and to prevent any great permanent melioration of their condition."

To sum up :

"1. Population is necessarily limited by the means of subsistence.

"2. Population invariably increases where the means of subsistence increase, unless prevented by some very powerful and obvious checks.

"3. These checks, and the checks which repress th superior power of population, and keep its effects on a level with the means of subsistence, are all resolvable into moral restraint, vice and misery."

"The first of these propositions," said Malthus, "scarcely needs illustration. The second and third will sufficiently be established by a review of the immediate checks to population in the past and present state of society."

This review occupies the remainder of the first, and the whole of the second, of the four books into which

the essay is divided. In the light of the facts revealed therein, Malthus then resumes his general argument with a pointed question: "Whatever was the original number of British emigrants which increased so fast in North America, let us ask, Why does not an equal number produce an equal increase in the same time in Great Britain?" "The obvious reason," he answers, "is the want of food; and that this want is the most efficient cause of the three immediate checks to population, which have been observed to prevail in all societies, is evident from the rapidity with which even old states recover the desolations of war, pestilence, famine and the convulsions of nature."

"Other circumstances being the same," he adds, a few pages later, "it may be affirmed that countries are populous according to the quantity of human food which they produce or can acquire; and happy according to the liberality with which this food is divided, or the quantity which a day's labour will purchase. Corn countries are more populous than pasture countries, and rice countries more populous than corn countries. But their happiness does not depend either upon their being thinly or fully inhabited, upon their poverty or their riches, their youth or their age; but on the proportion which the population and the food bear to each other. . . .

"It is probable that the food of Great Britain is divided in more liberal shares to her inhabitants at the present period than it was two thousand, three thousand, or four thousand years ago. And it has appeared that the poor and thinly-inhabited tracts of the Scotch Highlands are more distressed by a redundant population than the most populous parts of Europe."

This was Malthus's Principle of Population. What did it add to the sum of human knowledge? The

idea that human beings might become so numerous that the earth could not produce sufficient food for their support had been familiar, as we have seen in Chapter I, to various writers at different periods in history. Indeed, it is self-evident. "I do not much see," said Hazlitt, "what there is to discover on the subject, after reading the genealogical table of Noah's descendants, and knowing that the world is round." Malthus admitted that the subject had been ably treated by earlier writers, but he claimed to have made the comparison between the increase of population and food with greater force and precision. The precision, however, was more apparent than real. When he said that population, if unchecked, would increase in a geometrical ratio, whereas subsistence cannot increase in more than an arithmetical ratio, Malthus appeared to be making effective use of his mathematical knowledge. (He was ninth wrangler at Cambridge.) In fact, he was stating his case badly. "For every mouth, God sends a pair of hands," and if, as Malthus supposed, "the human species would, if unchecked, increase as the numbers 1, 2, 4, 8, 16, 32, 64, 128, 256, and subsistence as the numbers 1, 2, 3, 4, 5, 6, 7, 8, 9" it would follow that an addition of 128 workers in the period 2000–2025 would have a total productive value equal to that of only one additional worker in the period 1800–1825. This in spite of all the improvements in the methods of cultivation which might have been evolved in 175 years! There is nothing in the essay, except an appeal to "the known qualities of land," to establish the truth of this statement, or indeed to show conclusively that the hands which normally accompany each mouth

could not make the earth yield the subsistence for an indefinite increase in population.

§ 3. *The Law of Diminishing Returns.* Unfortunately for the human race, the essential validity of the Malthusian principle of population is not destroyed by the substitution of an accurate account of the growth of the food supply for the fallacious arithmetical ratio. Turgot stated the truth of this matter quite clearly when Malthus was two years old; Malthus himself showed that he understood it in his later writings, and Ricardo and Mill elaborated it in what is called *The Law of Diminishing Returns.*

This law arises out of the peculiarity of land from an economic standpoint, to which attention was called in the first volume of this series. It is unlike capital or labour in that its supply is, broadly speaking, fixed and unalterable. An increase in population implies an increase in the supply of labour. The supply of capital will probably expand at least proportionately to the increase in population. But the supply of land remains unchanged.

At certain periods in history this characteristic of land was probably unimportant to mankind. Nobody wanted to increase the supply of land when there was room enough and to spare for all. When "Abram was very rich in cattle. . . . And Lot also, which went with Abram, had flocks, and herds, and tents. . . . And the land was not able to bear them that they might dwell together: for their substance was great so that they could not dwell together," they had only to walk off in different directions and all was well, unless they

chanced to come in conflict with other tribes. But in the modern world, the herdsman and the shepherd have to compete for land, not only with other herdsmen and shepherds, but, in many places, with the grower of wheat and other crops, and even with the builder of houses and factories. Thus, as the population increases the demand for land increases, and, the supply being fixed, men are obliged to study the means by which they can bring new and presumably inferior land into cultivation, or get an ever-increasing quantity of produce from the same quantity of land. There are two ways in which this can be done. The first is by discovering and applying improved methods of production. The second is by using increasing quantities of the other agents of production: capital and labour. The discovery of better methods of production is obviously a variable and incalculable factor in the problem; but experience has shown that certain definite results may be anticipated from the application, in any given stage of agricultural knowledge and skill, of steadily increasing quantities of capital and labour to the unexpanding earth.

Turgot said:

"Seed thrown on a soil naturally fertile but totally unprepared would be expenditure almost entirely wasted. If the ground were once tilled the produce would be greater; tilling it a second and a third time, might not merely double and triple, but quadruple or decuple the produce, which will thus augment in a much larger proportion than the expenditure, and that up to a certain point, at which the produce will be as great as possible compared with the expenditure. Past this point, if the expenditure be still increased, the produce will still increase,

but less and less, and always less and less, until the fecundity of the earth being exhausted, and art being unable to do anything further, an addition to the expenditure will add nothing whatever to the produce." [1]

On the basis of this experience, which is confirmed by every farmer, it is customary to say that when successive doses of capital and labour are applied to land, increasing returns to each dose are first obtained, but that after a certain point has been reached, diminishing returns to each subsequent dose inevitably follow, unless an improvement is made in the methods of agriculture. Moreover, in old countries, practically all the land has been worked at least as thoroughly as is necessary in order to reach the point at which the maximum returns are obtained; and it is therefore broadly true to say that, unless better methods of cultivation are used *an increase in the capital and labour applied in the cultivation of land causes a less than proportionate increase in the amount of produce raised.* This statement is called the Law of Diminishing Returns.

If we now substitute the Law of Diminishing Returns in agriculture for the arithmetical ratio of Malthus's Essay, we shall see that the conclusion remains unchanged. "It is vain to say that all mouths which the increase of mankind calls into existence bring with them hands. The new mouths require as much food as the old ones, and the hands do not produce as much." [2] Population must still press upon the means of sub-

[1] Quoted by Cannan, *Wealth*, p. 60.

[2] J. S. Mill, *Principles*, Book I, Chap. XIII, § 2.

sistence unless the checks of vice, misery or moral restraint intervene.

Reconsidering the Principle of Population in the light of Diminishing Returns, it is important to note the emphasis which Malthus placed upon the *constant operation* of the checks to population which arise out of a want of food. This was perhaps his most solid contribution towards an understanding of factors which limit the number of human beings upon the earth. Hume, Wallace, Condorcet and even Godwin had written of the danger of over-population, but they had regarded it as an evil which might arise in a more or less remote future. Malthus pointed out that the population was constantly held in check, at all times and in all countries, by the evils which arose, directly or indirectly, from pressure upon the food supply. If people refrained from having children because they had insufficient means to support a family, or if children died in infancy from diseases caused by mal-nutrition, the population was being kept down by want of food, though no one might die of starvation. "A man who is locked up in a room," said Malthus, "may fairly be said to be confined by the walls of it, though he may never touch them." Even so was the human race confined to the numbers which the world's produce would support at any given time. Unless we deliberately restricted our numbers, they would be kept down by the powerful checks which he described. This was the point that Hazlitt overlooked when he made his joke about "the genealogical table of Noah's descendants," and it is not infrequently overlooked by more serious critics of the Malthusian doctrine.

§ 4. *The Relevance of the Malthusian Argument to Present Circumstances.* In the days of Malthus each country was practically a self-contained and self-supporting community. In England the Industrial Revolution had begun. Its disturbing influence contributed to the misery and discontent which Malthus saw around him. The spinning jenny came into use in the same year in which the essay was first published. Cartwright's loom began to be used in 1801. But it was not until 1838 that the first commercial steamer crossed the Atlantic, and not until about 1870 that the full effect of inventions and international trade had worked itself out in the world-wide division of labour. Goods can now be brought from the most distant countries more cheaply and almost as quickly as they could be carried from London to Cornwall in the time of Malthus. The population of Great Britain and Ireland was 16,000,000 in 1801, and 41,500,000 in 1901. Total British imports and exports were £37,000,000 in 1791, and £870,000,000 in 1901. The population problem with which Malthus was especially concerned, the problem of feeding a rapidly increasing number of Englishmen on the produce of an island which remained the same size, was solved, for a hundred years at least, by an immense increase in the production of manufactures and the exchange of these for food and raw materials from new continents. As numbers increased food actually became cheaper ; more emigrants were available to grow food abroad, and more workmen were absorbed in Europe in the production of the agricultural machinery, steamers and railways which enabled the food to be produced and carried home for their consumption.

During the latter half of the nineteenth century, a unit of labour applied to industry in Europe could be exchanged for a steadily increasing quantity of food.

It would seem, at first sight, that the teaching of Malthus could have little relevance to the problems of the twentieth century. Fundamentally, however, the issue remains the same. How is the population of the world to be restrained from increasing faster than the world's food supply, except by the evil checks enumerated by Malthus ?

The teeming population of Europe does not produce nearly as much food as it consumes ; it is dependent upon the resources of the New World. But the New World is no longer wholly dependent upon Europe for its manufactures. It produces them itself in increasing quantities.

Population is growing in the food-producing countries. The United States, which is one of the chief sources from which Europe draws her food, now consumes more than three-fourths of the wheat she produces. It is true that the food-producing area of the world may still be greatly extended ; but this will only be done under the stimulus of a rise in the price of produce. This means that, in all probability, diminishing returns in food will in future be obtained for each successive dose of capital and labour applied in industry.

The position with regard to the raw materials of European industry, in so far as these are products of the soil, is very like that of the food supply. The production of cotton, for instance, has not kept pace with the world's requirements. Since about 1900 a considerable increase in price has been needed to enable

the supply of cotton to equal the demand for it, and it is anticipated that a further rise in price will be necessary to call forth any substantial increase in the quantity produced. Here, again, we may see the Law of Diminishing Returns at work.

Other raw materials of industry, such as coal and iron, are in a different category. These minerals are in the nature of stored-up capital. The yield from mines is like the yield from lands which have been for some time under cultivation, in that each additional dose of capital and labour applied to the extraction of minerals will produce a smaller proportionate return than the last preceding dose, unless some improvement takes place in the arts of mining. But the produce of a mine is part of a fixed stock. Once a vein has given up its treasure, it can produce no more; whereas a properly cultivated field retains its fertility, and yields a constantly recurring income. When, therefore, a country like Great Britain finds itself, by the international division of labour, in the position of exchanging minerals, and the goods manufactured from minerals, for the raw products of distant lands, an anxious question arises as to whether the process can indefinitely continue. A country which possessed a monopoly of an absolutely indispensable mineral would no doubt be in a strong position. By husbanding her resources she might extract an enormous tribute from the rest of the world. But even a unique commodity like Welsh steam coal has to compete in the world's markets with other fuels such as oil. It is not indispensable.

From the point of view of the human race as a whole,

it is comforting to know that science is perfecting other devices, such as water-power, to carry on the work of the world when the coal supply is exhausted. Mankind may not be forced to return to the primitive methods of hand-labour. Particular nations, however, which have built up great industries and become densely populated through a differential advantage over other nations in the possession of mineral wealth, are faced by the possibility of losing that advantage, and being forced to compete for their share of the world's food supply with the handicap against them.

The law of diminishing returns is not, of course, a force which exerts itself suddenly with catastrophic effects. The period of abundant supplies, resulting from the development of vast food-producing areas, fades almost imperceptibly into a period of relative scarcity. If the organization of European life had not been torn asunder by the war, the tendencies outlined in the preceding paragraphs, vaguely menacing the future well-being of Europe's population, would not yet have been noticed by practical men. Improvements in the organization of industry in Europe may so increase productive power that no falling off in the general well-being need result from an increase in the cost of food. It is even possible that improvements in the arts of agriculture may still for a time keep pace with the growth of population, and that food may remain as cheap and plentiful in the immediate future as it has been in the last fifty years. Nevertheless, the tendency for population to outrun the means of subsistence is a potent fact in the life of humanity. The number of people in the world has increased greatly during an exceptional period in

economic history. Some of the factors which made that increase possible appear to have run their course; others are beginning to show signs of exhaustion. If population continues to increase "in geometrical ratio," a decline in the general standard of life seems wellnigh inevitable. But a decline in the general standard of life means want and misery and suffering for the majority of human beings. Is there no other hope? Let us turn again to Malthus and see what light he can throw upon the matter.

§ 5. *An Important Development.* On the evidence before him, it was natural that Malthus should take a gloomy view of the prospects of mankind. The information he collected seemed to show that in all countries at all times population rapidly increased up to the means of subsistence, and that the lower classes were consequently always living on the verge of destitution. In England, at the time when he was writing, a number of causes had combined "to bring the working classes into the greatest misery they have ever suffered, at all events since the beginning of trustworthy records of English social history."[1] And their pastors and masters were still exhorting them to "increase and multiply"! Nevertheless, Malthus was not without hope that conditions might be improved:

"The object of those who really wish to better the condition of the lower classes of society," he said, "must be to raise the relative proportion between the price of labour and the price of provisions, so as to enable the labourer to command a larger share of the necessaries and

[1] Marshall, *Principles of Economics*, Book IV, Chap. IV, § 2.

comforts of life. In an endeavour to raise the proportion of the quantity of provisions to the number of consumers in any country our attention would naturally be first directed to the increasing of the absolute quantity of provisions; but finding that, as fast as we did this, the number of consumers more than kept pace with it, and that with all our exertions we were still as far as ever behind, we should be convinced that our efforts directed only in this way would never succeed. It would appear to be setting the tortoise to catch the hare. Finding, therefore, that from the laws of nature we could not proportion the food to the population, our next attempt should naturally be to proportion the population to the food. If we can persuade the hare to go to sleep, the tortoise may have some chance of overtaking her.

"We are not, however, to relax our efforts in increasing the quantity of provisions, but to combine another effort with it; that of keeping the population, when once it has been overtaken, at such a distance behind as to effect the relative proportion which we desire; and thus unite the two grand *desiderata*, a great actual population and a state of society in which abject poverty and dependence are comparatively but little known; two objects which are far from being incompatible."[1]

There is more reason now than there was when the above passage was written to think that the hare may be persuaded to go to sleep. Malthus firmly refused to entertain mere conjectures:

"A writer may tell me," he said, "that he thinks man will ultimately become an ostrich. I cannot properly contradict him. But before he can expect to bring any reasonable person over to his opinion, he ought to show that the necks of mankind have been gradually elongating; that the lips have grown harder, and more prominent; that the legs and feet are daily altering their shape; and

[1] *Essay*, Book IV, Chap. III.

that the hair is beginning to change into stubs of feathers. And till the probability of so wonderful a conversion can be shown, it is surely lost time and lost eloquence to expatiate on the happiness of man in such a state. . . ."[1]

Well, we have evidence to-day, of the kind that Malthus properly demanded, that there is a tendency for men deliberately to restrict the number of their children, with a view to maintaining a certain standard of well-being and happiness. It is only a tendency at present, but it is a significant tendency. In France, the population is stationary. In Great Britain the birth-rate has rapidly declined during the last half century, and a similar tendency has manifested itself in most Western countries. There is no doubt that this change is mainly due to what is called "birth control," the conscious limitation by married people of the size of their families. So far, the coloured races, with the possible exception of Japan, have not adopted birth control. Moreover, in those countries where its influence is already perceptible, the richer classes are at present more affected by it than their poorer neighbours. Thus this new check to population may be said to be beginning at the wrong end of human society, and restricting the families of those who could best afford to multiply. The importance of this aspect of the subject will be discussed in a later chapter. Here it is only necessary to note a new development which may enable the population to adjust itself to changing circumstances without suffering the degrading miseries of privation.

[1] *Essay*, First Edition, Chap. I.

CHAPTER III

POPULATION THEORIES IN CHANGING CIRCUMSTANCES

"For man also knoweth not his time: as the fishes that are taken in an evil net, and as the birds that are caught in the snare; so are the sons of men snared in an evil time, when it falleth suddenly upon them." *Ecclesiastes* ix. 12.

§ 1. *Why Malthus had many Disciples.* Very few books have the distinction of being so fully discussed at the time they are first published as was Malthus's Essay. Tories like Southey vied with Radicals like Godwin and Hazlitt, and revolutionaries like Cobbett, in the violence of their attacks upon the book and its author. It was said by the same critics that the doctrine was obvious, that it wasn't true, and that Malthus didn't discover it. The Tory opposition was based on the feeling that the ordering of the universe by Providence was being criticised. But it was Godwin, the Freethinker, who quoted texts from the Bible against "Parson Malthus," and Cobbett who invented that name for him.

In spite of, or perhaps because of these attacks, the Essay was very widely accepted among the Whigs and Utilitarians. Pitt, as we have seen, was much impressed by it. Paley was a distinguished convert. Senior, Ricardo and Whitbread all supported Malthus.

So did James Mill, of whom Leslie Stephen says that "he ultimately became the father of nine children, an oversight for which his eldest son apologises." On the whole it may be said that the Principle of Population received the assent, during the lifetime of its author, of most reasonable men, with some additional support from men of property who were glad to throw upon the poor the whole responsibility for their poverty, and to be satisfied that nothing could be done for them while they remained so improvident as to marry and beget children.

How, then, are we to account for the fact that this doctrine, which achieved such prominence at the beginning of the nineteenth century, gradually slipped out of men's minds and, without being superseded or controverted, was almost forgotten a hundred years later? The answer to this question is to be found in the economic developments of the period.

We saw in the first chapter of this handbook that population theories, not only the ignorant prejudices of the ordinary man, but the considered opinions of philosophers and statesmen, could generally be associated with the temporary circumstances of the countries in which the theorists lived. Plato and Aristotle approached the question from the point of view of the City State, and consequently recommended a stationary population; the Romans, with the world at their feet, desired an ever-increasing supply of citizens; the Elizabethans, face to face with an immense problem of poverty and destitution, the result of many causes—the enclosing of land for pasture, the dissolution of monasteries, the debasing of the currency and the decay

of the guilds—were fully alive to the dangers of over-population; while the Mercantilist writers of the seventeenth and eighteenth centuries all favoured the greatest possible numbers as a means to national power; their cry was "Population, population! Population at all events!"[1]

This relation between doctrines of population and the conditions under which they are formulated can be traced in more recent controversies at least as clearly as in earlier times. F. S. Nitti, contrasting[2] the optimism of Adam Smith with the pessimism of Malthus, attributes the difference in outlook between the two to the events which took place in the twenty years which intervened between the publication of *The Wealth of Nations* in 1776 and that of Malthus's Essay. In that period, England experienced a succession of bad harvests, the effects of which were aggravated by an exhausting war and the dislocating influence of the industrial revolution. The average price of wheat in the decade 1771–1780 was 34/7; in 1781–1790 it was 37/1; in 1791–1800 it was 63/6; in 1801–1810 it was 83/11; and in 1811–1820 it was 87/6. Moreover, as in the crowded days of Elizabeth, the enclosing of common land and a disastrous Poor Law vastly increased the number of the destitute.

Malthus has told us that he wrote his book because he had an argument with his father about Godwin's views on the perfectibility of man. The first edition of the Essay was indeed manifestly designed to combat the theories, which became so popular during the French Revolution, as to the infinite potentialities of

[1] Joseph Townsend, *Dissertation on the Poor Laws*, 1786.
[2] *Population and the Social System*.

the human race. By the time he reached his second edition, however, Malthus was more concerned to throw light upon the cause of the poverty and distress of his fellow-countrymen than to pursue an abstract argument. Moreover, if it had not in fact dealt with a problem about which all thoughtful men were agitated, it is probable that the first anonymous essay would have passed unnoticed, and that the later tome would never have been written. So we may take it that the Malthusian Principle of Population was enunciated because England was (at least in a narrow sense) over-populated at the end of the eighteenth century.

§ 2. *How Diminishing Returns Revealed Themselves.* The formulation of the tendency to diminishing returns arose even more directly out of the social and political conditions of England at the end of the Napoleonic Wars. The high price of corn had given rise to a great extension of cultivation and to improved methods. The Corn Laws probably had very little to do with the high prices, but landlords and farmers of course desired the high prices to continue, and urged Parliament to restrict imports. The Commons and the Lords both appointed Committees which reported in favour of a protectionist policy, and it was in the course of criticizing these Reports that Edward West, Malthus[1] and Ricardo stated the tendency to diminishing returns and drew inferences from it. To them the case was perfectly clear. They had seen the tendency at work.

[1] Malthus was a protectionist, but he could not swallow all the arguments of the landlords. There is an excellent account of the controversy in Cannan's *Theories of Production and Distribution*, Chap. V.

"With every increase of capital and population," wrote Ricardo, "food will generally rise, on account of its being more difficult to produce."

"The division of labour and application of machinery," said Edward West, "render labour more and more productive in manufactures, in the progress of improvement; the same causes *tend* also to make labour more and more productive in agriculture in the progress of improvement. But another cause, namely, the necessity of having recourse to land inferior to that already in tillage, or of cultivating the same land more expensively, *tends* to make labour in agriculture less productive in the progress of improvement. And the latter cause more than counteracts the effects of machinery and the division of labour in agriculture."

Thus, there are two opposing tendencies in production. On the one hand, there is the tendency for each successive dose of capital and labour to facilitate improvements in organization and so to yield *increasing returns*. On the other hand, there is the tendency, discussed in the last chapter, for nature to yield *diminishing returns*. Both these tendencies showed themselves very clearly in England during the first half of the nineteenth century. By 1815 the power loom was coming into general use, enabling the weavers to keep pace with the spinners, whose jenny had been worked by water-power for some years before that date. In 1740, about a million and a half pounds of cotton was imported, in 1815 nearly one hundred millions. In 1742, about 100,000 pieces of cloth were milled in Yorkshire, in 1815 the number had risen to 500,000, and each piece was double the former length. Coal, iron and transport developed in an equally amazing

way; while the population, fully justifying the faith of Malthus, increased in the industrial North by 75 per cent between 1801 and 1821.

The very magnitude of these developments involved the working classes in misery and discontent. The population of England was on the move, and the process created an "economic friction" of a very painful kind. The price of food rose alarmingly, and wages lagged drearily behind. Adult labour was displaced to a considerable extent by child-labour in the factories and mines; and the misapplication of the *laissez-faire* doctrine aggravated the distress and fomented the discontent.

§ 3. *Reaction against Malthus and Ricardo.* By degrees, however, England recovered its equilibrium, and voices began to make themselves heard, saying that there was, after all, no tendency to diminishing returns. James Mill, M'Culloch and J. S. Mill adhered to the teaching of Malthus and Ricardo, but Senior, Chalmers and the American economist, Carey, attacked it.

"Any given quantity of labour," said Carey, "will now command a much larger quantity of food than at any former time, and the tendency is to a constant increase. . . ."

This bold statement he supported by comparing the productiveness of agriculture in 1840 with the miserable returns obtained in 1389, as recorded in Eden's *History of the Poor*:

"It is entirely impossible," he said, "to read any book treating of the people of England of past times, without being struck with the extraordinary improvement of the means of living—with the increased facility of obtaining

food, clothing and shelter, and with the improved quality of all—enabling the common labourer now to indulge in numerous luxuries that in former times were unknown to people who might be deemed wealthy."

Carey was, of course, quite right as to the facts. The fertile lands of the New World in which he lived were in the early stages of cultivation, yielding increasing returns, and the people of England were now beginning to reap the benefit of that development combined with some share in the fruits of their own industrial activity. The tendency of that time was to a constant increase, and many a wiser man than Carey has treated that extraordinary boom in world production as the normal return to human efforts which would increase at the same rate for ever.

The changes of the Industrial Revolution caused a double reaction against the doctrines of Malthus and Ricardo. The growth of industry and wealth, on the one hand, gave rise to an optimism which rejected the notion that the bulk of mankind must always live upon the brink of destitution. The distress which accompanied the great redistribution of labour, on the other hand, led to a demand for a more even distribution of wealth, which seemed equally to conflict with the teaching of the economists.

"In every experimental science," wrote Macaulay, in 1848, "there is a tendency towards perfection. In every human being there is a wish to ameliorate his own condition. These two principles have often sufficed, even when counteracted by great public calamities and by bad institutions, to carry civilization rapidly forward. No ordinary misfortune, no ordinary misgovernment, will do

so much to make a nation wretched, as the constant progress of physical knowledge, and the constant effort of every man to better himself will do to make a nation prosperous. . . . It can easily be proved that, in our own land, the national wealth has, during at least six centuries, been almost uninterruptedly increasing; that it was greater under the Tudors than under the Plantagenets; that it was greater under the Stuarts than under the Tudors; that, in spite of battles, sieges and confiscations, it was greater on the day of the Restoration than on the day when the Long Parliament met; that, in spite of maladministration, of extravagance, of public bankruptcy, of two costly and unsuccessful wars, of the pestilence and of the fire, it was greater on the day of the death of Charles the Second than on the day of his Restoration. This progress, having continued during many ages, became at length, about the middle of the eighteenth century, portentously rapid, and has proceeded, during the nineteenth, with accelerated velocity. In consequence partly of our geographical and partly of our moral position, we have, during several generations, been exempt from evils which have elsewhere impeded the efforts and destroyed the fruits of industry. . . . The consequence is that a change to which the history of the old world furnishes no parallel has taken place in our country."[1]

Nine years later, Macaulay added:

"During the interval which has elapsed since this chapter was written, England has continued to advance rapidly in material prosperity. . . . There is scarcely a district which is not more populous, or a source of wealth which is not more productive, at present than in 1848."[2]

This was the intellectual atmosphere in England in the middle of the nineteenth century. The formal accuracy of the statement about diminishing returns

[1] *History of England*, Chap. III. [2] *Ibid.* (note).

was not generally denied, but there seemed to be little significance in a tendency which was continuously counteracted by more powerful opposing tendencies. The history of civilization seemed to show that mankind always had, from the days when human co-operation first began, risen superior to the tendencies to which Malthus and Ricardo called attention. Primitive savages were limited in numbers by the means of subsistence which they found within their reach; but as soon as men learned to combine together and to fashion implements, they began to harness wild nature and to make her yield more and more food and warmth and shelter for their satisfaction. Therein lay the difference between human beings and brute beasts; the former could learn to exercise a constantly increasing control over their environment, and the latter could not. It was not true to say that population invariably increased up to the limits of the available subsistence. On the contrary, every increase in the numbers of the people brought with it a more than proportionate increase in human wealth, so that the standard of life had been steadily improving and every additional worker put more into the common stock than he drew out of it. Hence the most densely populated districts offered the greatest and most varied supply of the amenities of life.

Thus, "the tendency of every experimental science towards perfection," and "the wish of every human being to ameliorate his own condition" were seen by Macaulay and his contemporaries to carry civilization rapidly forward in spite of the tendency to diminishing returns and all other obstacles.

§ 4. *J. S. Mill's View of Population Problems.* John Stuart Mill, however, adhered firmly to the general teaching of Malthus and Ricardo, which he restated in a more complete and scientific form. Professor Cannan says he did this because "he was never able to shake off completely the effects of the gloomy theories . . . with which his father had indoctrinated him," and that "if he had done so he would have had to find a new way of accounting for the historical fall of profits and also to change most of his views with regard to the whole question of economic progress."[1] Another possible explanation of Mill's attitude is, however, that he had too well-disciplined a mind to be deflected from a permanent truth by the special circumstances of the century in which he lived, however astonishing and overwhelming those circumstances might be.

"It is but rarely," said Mill, "that improvements in the condition of the labouring classes do anything more than give a temporary margin, speedily filled up by an increase in their numbers. The use they commonly choose to make of any advantageous change in their circumstances, is to take it out in the form which, by augmenting the population, deprives the succeeding generation of the benefit. Unless, either by their general improvement in intellectual and moral culture, or at least by raising their habitual standard of comfortable living, they can be taught to make a better use of favourable circumstances, nothing permanent can be done for them; the most promising schemes end only in having a more numerous, but not a happier people."[2]

By their habitual standard, Mill meant the standard below which the people would not multiply, and he

[1] *Theories of Production and Distribution*, Chap. V, § 5.
[2] *Principles*, Book I, Chap. X, § 3.

noticed with satisfaction that every advance in education, civilization and social improvement tends to raise this standard.

"Subsistence and employment in England," he said, "have never increased more rapidly than in the last forty years, but every census since 1821 showed a smaller proportional increase of population than that of the period preceding; and the produce of French agriculture and industry is increasing in a progressive ratio, while the population exhibits, in every quinquennial census, a smaller proportion of births to the population."[1]

Mill was fully alive to the fact that "there is another agency, in habitual antagonism to the law of diminishing return from land. . . . It is no other," he said, "than the progress of civilization. I use this general and somewhat vague expression, because the things to be included are so various that hardly any term of a more restricted signification would comprehend them all."[2]

In "the progress of civilization" Mill included, first, the progress of agricultural knowledge, skill and invention. A development such as the introduction of rotation of crops, or the irrigation of a barren plain, may make a great permanent change in the yielding capacity of land, altering the point at which maximum returns are obtained. Secondly, he included improved means of communication. Thirdly, mechanical improvements which have apparently no connection with agriculture; such as a better method of melting iron, which would cheapen agricultural implements and transport; or

[1] *Principles*, Book I, Chap. X, § 3.
[2] *Ibid.*, Chap. XII, § 3.

the use of power in grinding corn, which would tend to cheapen bread. Fourthly, inventions which facilitate the production of manufactures and so compensate the poorest class for the increased cost of food by supplying them with, for instance, cheaper clothing. Fifthly, improvements in government, and almost every kind of moral and social advancement, which react upon the efficiency of agricultural labour.

When all these factors are outstripped by the growth of numbers, there are still two expedients, noted by Mill, by which a country may hope to lessen the pressure of its population upon its food supply. One of these expedients is the importation of food from abroad. The other is emigration.

§ 5. *A Criticism of Mill's View.* Throughout the nineteenth century the tide of civilization, flowing through all the channels indicated by Mill, continued to rise, easily overcoming the tendency to diminishing returns. Hence it became fashionable to speak of this "pseudo-scientific law," and even so acute a critic as Professor Cannan asked, in 1903, why :

> "Mill should be at the trouble of developing a law which
> 1. does not come into operation at a very early date in the history of society ;
> 2. is liable to temporary supersessions ; and
> 3. has been made head against by an antagonizing principle, namely, the progress of civilization, throughout the known history of England."

As against this view it may be urged that if we were to ignore all those scientific laws which are counteracted

by other laws, we should not get very far in our interpretation of phenomena ; that, in fact, the tendency to diminishing returns had already played an important part in economic history ; and, finally, that at the very time when Professor Cannan was writing, the tendency was, as we have seen, " making head " against " the progress of civilization," and was perhaps preparing the way for great and painful changes in the welfare of the inhabitants of the Old World.

Thirteen years later, Professor Cannan was quoting, with approval, the following passage :

" The conditions which made possible the unprecedented expansion of the European peoples in the last fifty years are passing away. The agricultural development which came as a result of rapid transportation, the invention of labour-saving farm machinery, and the abundance of new and fertile lands cannot be duplicated. The system of transportation can be greatly improved, but no revolution such as came with the development of the steam engine seems likely to take place again. The efficiency of agricultural implements will probably be greatly increased, but they have already reached the limit of practicability for extensive farming, not because the implements might not be improved upon, but because the days of extensive farming are rapidly passing as the new countries become more thickly settled. Fertile land is no longer to be had for the asking in the United States, and will soon be taken up in the other places where Europeans can thrive."[1]

" I should like to suggest," comments Mill's critic, " that the next bishop who proposes to recommend unreasoning multiplication as a universal rule of

[1] *Population : A Study in Malthusianism,* by Warren S. Thompson, Ph.D. (New York).

human conduct should take this passage from Dr. Thompson's book as his text. The predictions which it contains may be premature, but they cannot be erroneous in any other sense. This little planet is getting filled up; if we go on increasing our numbers indefinitely, we must eventually make it too full, in spite of that steady progress in material equipment and knowledge which tend to set the limits of desirable density farther on."[1]

The limits of desirable density are indeed difficult to determine. Even if we could say for certain that the average worker in a country is better off to-day than he has ever been before, we must still admit that he might be even richer if the population were smaller. On the other hand, while it is safe to say that the developments in agriculture and industry have a causal connection with the growth of population, no one can gauge to what extent the one would have taken place without the other. These are matters upon which there is room for the widest difference of opinion. Moreover, even if we could say precisely what number of people would at any given moment obtain the maximum wealth per head, we should still be very far from determining the limits of desirable density. For who will measure the value of human life? How much material wealth shall we be willing to forgo in order to have children of our own? What proportion of national wealth per head will the statesman sacrifice in order to obtain more soldiers and colonists for the enhancement of national prestige?

Malthus assumed that it was undesirable for

[1] *Economic Journal*, Vol. XXVI, No. 102, June, 1916.

population to press upon the means of subsistence up to the point at which the checks of vice and misery begin to operate. So far, perhaps, there may be general agreement. But, as Mill pointed out, the standard of living below which the people will not multiply varies from time to time and in different countries and among the classes and occupations within each country. The tragedy of vice and misery is most apparent when any class is forced to lower its standard of living. That is the catastrophe which has befallen large sections of the population of Europe during the years immediately succeeding the war. Is it a temporary product of the great upheaval, from which a recovery may be expected when the statesmen have at last put their houses in order? Or has the war merely accelerated an inevitable decline in European prosperity; the result of the changing ratios of raw products and manufactured goods? Are we witnessing a world-wide manifestation of the tendency to diminishing returns? It will be the principal object of the following chapters to indicate some of the factors which must be taken into account in answering that question.

§ 6. *The Return to Malthus.* Whatever the causes may have been, the Wheel of Things to which, in the lama's philosophy, the human race is bound, has turned full circle. Again, as in the days of Malthus, Europe has been exhausted by a great war; famine and disease ravage large tracts of Russia and the Balkans; international trade is dislocated, and Britain is struggling once more with the dual problem of unemployment and doles.

Opinion has swung round with the tide of events. Far more striking than the contrast between Adam Smith and Malthus is that between the passage from Macaulay quoted above[1] and the following extracts from a book published in the year 1919:

"Before the eighteenth century mankind entertained no false hopes. To lay the illusions which grew popular at that age's latter end Malthus disclosed a Devil. For half a century all serious economical writings held that Devil in clear prospect. For the next half century he was chained up and out of sight. Now perhaps we have loosed him again. . . .

"The prosperity of Europe was based on the facts that, owing to the large exportable surplus of foodstuffs in America, she was able to purchase food at a cheap rate measured in terms of the labour required to produce her own exports, and that, as a result of her previous investments of capital, she was entitled to a substantial amount annually without any payment in return at all. The second of these factors then seemed out of danger, but, as a result of the growth of population overseas, chiefly in the United States, the first was not secure. . . .

"In short, Europe's claim on the resources of the New World was becoming precarious; the Law of Diminishing Returns was at last reasserting itself, and was making it necessary year by year for Europe to offer a greater quantity of other commodities to obtain the same amount of bread; and Europe, therefore, could by no means afford the disorganisation of any of her principal sources of supply. . . .[2]

"The essential facts of the situation, as I see them, are expressed simply. Europe consists of the densest aggregation of population in the history of the world. This population is accustomed to a relatively high standard

[1] See pages 47 and 48.
[2] *The Economic Consequences of the Peace*, by J. M. Keynes, Chap. II.

of life, in which, even now, some sections of it anticipate improvement rather than deterioration. In relation to other continents Europe is not self-sufficient; in particular it cannot feed itself. . . . The danger confronting us, therefore, is the rapid depression of the standard of life of the European populations to a point which will mean actual starvation for some (a point already reached in Russia and approximately reached in Austria). Men will not always die quietly. . . .

"Some of the catastrophes of past history, which have thrown back human progress for centuries, have been due to the reactions following on the sudden termination, whether in the course of Nature or by the act of man, of temporarily favourable conditions which have permitted the growth of population beyond what could be provided for when the favourable conditions were at an end."[1]

The view-point from which the foregoing passages were written is not adopted only by economists. In a somewhat different vein, but equally significant of the trend of opinion, is the following sketch of British economic history, also written in 1919:

"It was not till the accession of George III that the increase in our numbers became rapid. . . . The Industrial Revolution came upon us suddenly; it changed the whole face of the country and the apparent character of the people. In the far future our descendants may look back upon the period in which we are living as a strange episode which disturbed the natural habits of our race. . . . The basis of our industrial supremacy was, and is, our coal. . . . We were no longer able to grow our own food; but we made masses of goods which the manufacturers were eager to exchange for it; and the population grew like crops on a newly irrigated desert. During the nineteenth century the numbers were nearly quadrupled. Let those who

[1] *The Economic Consequences of the Peace*, Chap. VI.

think that the population of a country can be increased at will reflect whether it is likely that any physical, moral or psychological change came over the nation coincidently with the inventions of the spinning jenny and the steam engine. It is too obvious for dispute that it was the possession of capital wanting employment, and of natural advantages for using it, that called these multitudes of human beings into existence, to eat the food which they paid for by their labour. And it should be equally obvious that the existence of forty-six millions of people upon 121,000 square miles of territory depends entirely upon our finding a market for our manufactures abroad, for so only are we able to pay for the food of the people. It is most unfortunate that these exports must, with our present population, include coal, which, if we had any thought for posterity, we should guard jealously and use sparingly; for in five hundred years at the outside our stock will be gone, and we shall sink to a third-rate Power at once. We are sacrificing the future in order to provide for an excessive and discontented population in the present."[1]

It may be that the writers of these passages are not so representative of the general opinion of their time as Macaulay was of nineteenth-century culture. Perhaps there is to-day no general opinion upon broad social issues which we can compare with the coherent formularies of the Early Victorians. Here, at any rate, we have definite opinions, clearly expressed by writers who are widely read and discussed in Europe and America. By them we are brought face to face with the most fundamental of all economic problems; the relation of the number of human beings to the supply of the necessaries of life. They tell us, in effect, that we are living, and that our parents have been living, for

[1] W. R. Inge, *Outspoken Essays*, pp. 91 and 92.

fifty years, in a fool's paradise ; believing that they were building up our economic life upon solid foundations, and preparing the way for a happier posterity, whereas, in reality, they were squandering our family estates and wasting the gains of civilization on a mere increase in numbers.

This is a very different story from Macaulay's vision of a world in which the tendency to perfection overcomes all obstacles. It demands instant and thorough investigation. Thus far we have been mainly concerned with the history of a controversy. This was necessary if only to account for the neglect of population problems by the pre-war world. However pardonable that neglect may have been hitherto, it is clear that it must not and cannot continue. We must face the facts.

CHAPTER IV

FOOD AND RAW MATERIALS

"All the labour of man is for his mouth, and yet the appetite is not filled."

Ecclesiastes vi. 7.

§ 1. *Analogy between a Shrinking Earth and a Growing Population.* If the world were gradually growing smaller and population remaining constant, the effect upon human beings would be very like that produced by the growth of population in a world which remains the same size. It has been estimated that if the population of the world continued to increase at the rate at which it was growing between 1906 and 1911, it would double in sixty years. Let us imagine, therefore, that the world is shrinking at such a rate that it will be half its present size in sixty years. The suggestion seems rather an alarming one as it stands, but to make the analogy more accurate we must assume that the shrinkage is all taking place in the food-producing areas. We should rightly regard such a state of things as more serious than that which actually faces us. For, in the first place, the growth of population carries with it an opportunity for increased efficiency in production, which must be set off against the increased demand for food. Other things being equal, a thousand million people on half the earth would not, therefore, be so

well off as two thousand millions on the whole earth. In the second place, we know from experience that, unless some new discovery enables us to produce food more easily, the population will not, in fact, continue to increase at its present rate.

Though the analogy is not complete, however, it may serve to bring out a few points which would otherwise remain somewhat obscure. It illustrates the Law of Diminishing Returns. If the returns to agriculture remained constant, we should have no economic reason for alarm at the shrinking of the earth. The same quantity of capital and labour would be available and would yield the same amount of food when it was applied to a smaller quantity of land. Even a single field would then suffice to maintain the whole population at their present standard of living ! Such a supposition is obviously absurd ; but it is no more absurd than it would be to deny the tendency to diminishing returns. Recognizing then, as we should, that the shrinking earth would yield a smaller return of food to each successive dose of capital and labour applied to it, we should be forced to tackle the problem of maintaining the population on the food produced from a smaller acreage. The price of food would rise. Increasing quantities of capital and labour would be transferred from the production of other articles, such as clothes and houses, to the production of food. Some land, which is now more profitably used for other purposes, would also be ploughed up and put under cultivation. Thus, by a considerable transference of resources from the production of less essential commodities, the primary need of human beings for food would be supplied

and the whole population might continue to exist on a lower standard of comfort and well-being.

In all probability no actual famine would result from such a decrease in the size of the earth as we have supposed ; no one need die of starvation ; it is possible that no one need eat less food than before ; but food would be dearer and many other things would also be dearer and scarcer, because capital and labour would be diverted from making them in order to keep up the food supply. A unit of labour applied in industry would consequently yield a purchasing power over a smaller quantity of commodities of all kinds.

§ 2. *The Transference of Resources in War-time.* It is in this way that the pressure of population on the food supply makes itself felt. Those who were in England during the war will remember how tennis lawns were turned into potato patches and public parks divided up into allotments. It is impossible to say what loss of satisfaction was involved in this change. We only know that before and after the special food-shortage caused by the war, people preferred to take this part of their income in the form of games and flowers, but that when the pressure on subsistence reached a certain pitch they sacrificed these enjoyments in order to obtain fresh vegetables. A similar transference of resources was taking place on a much greater scale in the food-producing parts of the world. India, the first country to have a sowing time after the outbreak of war, immediately increased her wheat-growing area by 4,000,000 acres. In North America, 12,000,000 acres more wheat were sown in the spring of 1915. Australia

added 3,000,000 acres, about 30 per cent, to her wheat area. Altogether, therefore, the area of the world's surface devoted to the growing of wheat was increased during the first year of war by about 19,000,000 acres. These figures indicate considerable elasticity in the world's food supply. American and Canadian farmers had to decide whether to increase their acreage before they knew how far prices would rise or even whether they would be able to get their wheat to the European markets. They were therefore willing to make a considerable extension for a speculative return. In fact, they rather over-estimated the demand, or the exceptional harvests of 1915–16 upset their calculations; prices did not reach the expected level and the acreage under wheat decreased a little during the later years of the war. The farmers had shown, however, what they could do in a single year if more food were required. Moreover, there is still land in Canada uncultivated, and the possibilities of intensive cultivation there are enormous. The average yield of wheat in Canada is under 19 bushels an acre, while in the United Kingdom it is 32 bushels. In the Argentine, also, there has been during the last thirty years a tremendous extension of the area under wheat, and the application of intensive methods there may be expected to produce huge supplies. The United States had 71,500,000 acres under wheat in 1919, or 11,000,000 more than in any previous year; and 6,600,000 acres under rye, or three times the area under the crop in 1912.[1] This great extension of cultivation took place under the stimulus of Mr. Hoover's guaranteed price and,

[1] Sir R. Henry Rew, *Food Supplies in Peace and War.*

though very unlikely to be maintained, it shows what can be done.

"Why all this fuss, then, about the Law of Diminishing Returns and the pressure of population on the means of subsistence?" the reader, reassured by the foregoing paragraph, may ask. Why, dear sir, do you walk, or take a bus in the City of London, when there are taxis about and a Rolls-Royce to be bought round the corner? The question is whether the world, and more particularly Europe, can afford to go on increasing its population and paying the price required to extract these potential food supplies from the soil.

Why have so many city clerks given up their allotments since the war ended? Their reasons are instructive. One will tell you that he found "it didn't pay." He was tired when he returned from the office in the evening and did not feel inclined to go in for hard manual labour; and if he rose early in the morning to dig, he found himself sleepy and inefficient later in the day. Another would have liked to keep on his allotment, but the land was unfortunately required for other purposes. A third has changed his main occupation and no longer has time for cultivating the soil. A fourth is "fed up" with the disappointments due to drought, or insect pests, or some of the other obstacles which impede the cultivator, especially if he is not equipped with the most scientific knowledge and implements.

All these reasons illustrate the tendency for resources to be diverted into those occupations in which they can contribute the maximum net product. If food again became as scarce in Britain as it was during the war, these clerks would resume their agricultural efforts. If

it became still scarcer, they might even be induced to give up their city jobs and devote themselves to food production. It is the same in the world as a whole. The growth of population increases the demand for food. The Law of Diminishing Returns shows itself in an increasing difficulty in extracting further food supplies from the soil. More and more capital and labour are required for each proportionate increase in the supply, and, consequently, more and more human effort must be put into the making of other things that we ask the farmer to take in exchange for his produce. Otherwise, he will not think it worth while to cultivate his land more intensively. He will be content to grow the same quantity each year, unless he sees a prospect of making a profit out of the application of more capital and labour to his land. Thus, as the city clerk gave up his leisure or his tennis for potatoes, so every one may have to sacrifice various things from which he derives satisfaction in order to obtain a sufficient share of the food produced under these circumstances of increasing difficulty.

§ 3. *The Pressure of Population upon Subsistence.* It has already been indicated that the growth of population is not likely to be the cause of famine. The pressure upon the food supply produced by numbers alone is sufficiently gradual to allow an adjustment to be made in the allocation of resources before any danger of starvation occurs. People will give up luxuries of all kinds, and even necessities like fuel and shelter, before they will go without food. It is this gradual depression of the standard of life, rather than actual famine, that

is likely to result from an excessive growth of population. For when the standard of life has been reduced to any considerable extent, the death-rate will rise, children and old people succumbing to privation; and, even if the birth-rate remain unchanged, numbers will be kept within the bare means of subsistence. It is obvious, however, that a community which is thus reduced to the lowest necessities of life will suffer much more severely from a sudden dearth than one which has a margin of resources to draw upon. In this way over-population may be the main, though not the immediate, cause of famine. The population of European Russia increased from less than 100,000,000 in 1890 to about 150,000,000 at the outbreak of war; and the excess of births over deaths in Russia as a whole was at the rate of 2,000,000 per annum in the years immediately preceding 1914. This tremendous increase must have contributed greatly to the magnitude of the catastrophe before which the world now stands in horrified impotence. In India, too, the population has been increasing with disquieting rapidity owing to the removal by British rule of many of the checks to population which formerly prevailed; and it is probable that the recurrence of famines in that country is partly attributable to this increase. In large parts of India people are entirely dependent on agriculture, and the harvest is so completely destroyed by a single monsoon failure that the labourer is thrown out of work for a whole year. If he has no savings, he and his family must starve, or be kept alive by relief work, even though food may be obtainable from neighbouring districts. It is clear, therefore, that an increase in population

which absorbs the whole surplus of a normal harvest may transform the effect of a monsoon failure from unemployment into famine. Certainly the Indian Government has taken energetic steps to grapple with the famine problem, both in the way of prevention, by transport and irrigation schemes, and by the organization of relief when famines occur. No criticism of British rule is therefore implied here. It is only suggested that the growth of population may account for the fact that famines still occur in India, in spite of the measures which have been taken to avert them.

The preceding argument might be thought to imply that an increase in the number of the inhabitants of a country must always lower the standard of life which has hitherto prevailed there. That is not so. The factors that Mill grouped together under the comprehensive title of "the progress of civilization" make a certain increase in numbers frequently desirable. Some of these factors, indeed, depend upon an increase in numbers to enable them to come into action. If, therefore, we do not dwell so much upon the need for a certain increase as upon the disadvantages of an excessive increase, it is only because that "power of population," to which Malthus called attention, is so great that the former is always forthcoming when it is required. A multitude of the unborn are always crowding round the door of life. Open it a little way and they squeeze through in such numbers that you will have much ado to close it again!

§ 4. *The Economic Advantages of a Growing Population.* In comparing the growth of population with a shrinkage

of the earth, it was remarked that the former would be less alarming than the latter, because an increase in population carries with it an opportunity for increased efficiency in production. It will be worth while to examine that statement more closely.

The raw materials of manufactures are all either agricultural or mineral products, and the Law of Diminishing Returns applies, as we saw in Chapter II, to these as well as to food. The cost of raw materials, however, is often a very small part of the total cost of production in manufactures, and all the other costs tend to decrease as the amount of production increases. Manufactures are much more susceptible than agriculture to improvements in mechanical skill. Mass production enables very great economies to be made, and facilitates that world-wide division of labour which has contributed so enormously to the general wealth. In manufactures, therefore, the causes which tend to diminish costs as the amount produced increases have generally preponderated greatly over the tendency of the raw materials to increase in cost, and it is probable that in most industries the balance will remain tilted in a favourable direction for a long time to come. Moreover, the growth of population has facilitated that development of the means of transport both by land and sea, which as we have seen, enables the products of distant lands to be exchanged at trifling costs. The actual proximity of large numbers of human beings to one another, objectionable as it may be to those who love solitude and country scenes, enables great economies to be made in the distribution of goods, and renders possible some amenities of civilization, such as picture-

palaces and picture galleries, which could not be provided in a sparsely populated world. This gathering together of multitudes also has some effect in counteracting the tendency to diminishing returns in agriculture, by introducing an economy in the distribution of food. It is clear that British agriculture could not be profitably carried on so much more intensively than that of Canada unless proximity to the consumers exercised a powerful influence on costs. It is equally clear that if much smaller quantities of Canadian wheat were required in this country, the cost of bringing them to market would be increased.

Taking all these factors together it will be seen that the growth of population may under certain circumstances actually increase the amount of wealth per head, even though food may be getting dearer. Diminishing returns to agriculture and the diversion of an ever-increasing proportion of the total supply of capital and labour into the production of food and raw materials may be outweighed by the increasing returns obtained in manufactures. A smaller proportion of the total population employed in manufacturing industries may thus supply the aggregate wants of the community more fully than before. Houses and clothing may be so plentiful as to more than compensate for the comparative scarcity of food.

To put the same point in another way, let us assume that owing to improved machinery and business organization the Lancashire cotton industry is yielding increasing returns, in spite of some increase in the price of raw cotton. The wages of the cotton operative will tend to rise and the price of cotton goods to fall.

He may therefore be able to buy as much food as before at a higher price and still have more money to spend on other things; and these other things—boots and gramophones and rides on motor-coaches—may also be getting cheaper through economies obtained in their production on a large scale. His real income may thus be considerably increased.

It would be very interesting if we could distinguish between those economies in production which depend upon an increase in numbers and those which would take place if the population remained stationary. Unfortunately they are inextricably mixed up together. Many discoveries and inventions which depend upon the brain-work of a few men working in seclusion would certainly be made in any civilized society, whether the population was increasing or not. Some of these could be profitably applied under any circumstances. Others, however, like the discovery of steam and electricity, require a dense population if their potentialities are to be fully developed in such enterprises as railways and telegraphs. Probably an increasing population was necessary to call forth the capital for the great railway systems which were created throughout the world towards the end of last century. Manufacturers, again, certainly require a considerable density of population in order to obtain those economies of mass production and the division of labour which lead to such astonishing supplies of cheap and sometimes nasty goods. It is true that many people would rather have one suit of hand-made cloth than twenty suits of the stuff which is turned out by machinery, but it is clear, at any rate, that much larger quantities

of clothing, *per head*, are available in a densely populated world than could be produced by a scattered community. Finally, as we have already seen, there are economies in distribution which depend entirely upon a large population being congregated in a relatively small area, and many developments of civilization, some wholly good and others of more questionable intrinsic value, but all sought after by the modern town-dweller, which could not have been introduced into a less populous world.

It is not possible, then, to say with any precision how far the progress of civilization and the accumulation of wealth depend upon an increasing population. Up to a point, the growth of numbers has certainly contributed largely to the growth of wealth. There are indications, however, that the most sweeping economies which result from increasing numbers have already been secured in the industrial areas of Europe and the United States. It is probable that the wealth of civilized countries was still growing faster than the population, that the wealth per head was still increasing in the years immediately preceding the war. But it is probable also that the wealth per head would have been increasing faster still, if the population had not been growing so rapidly. From the economic point of view, at all events, there seems no reason to bemoan that slowing down of the rate of growth of the population of the Western world which has alarmed some English bishops and French patriots in recent years.

Taking a somewhat longer view, we may indeed see good reason to strengthen this tentative opinion. For if it appears to be somewhat undesirable for numbers

to continue to multiply rapidly when we are considering the immediate effect upon the welfare of the people, it will appear much less desirable when we look to the future.

The main raw materials of European industry are either imported from other continents or raised from mines. Those which are imported are chiefly agricultural products, like cotton and wool, which are subject to the Law of Diminishing Returns.

§ 5. *The Supply of Raw Cotton.* Now the production of cotton, as we saw in Chapter II, is not keeping pace with the demand for it. Between 1875 and 1895 the quantity of cotton produced in the United States increased so much that the price fell 54 per cent. Thus in a period of falling prices, cotton fell more than almost any other commodity. Between 1895 and 1910, however, when the average price of raw materials rose 25 per cent, the price of cotton rose 71 per cent, while wheat rose only 17 per cent. The American cotton belt had been invaded by wheat and other crops. The Western extension of the belt had been prevented by a shortage of negro labour. For the picking of cotton is disagreeable work, which must be done by hand, and it is practically confined in the United States to negro labour. Moreover, the growing demand of American mills had limited the amount of American cotton available for Lancashire, and though there are several other parts of the world in which cotton can be grown, there are few where labour conditions and climate are both favourable. Fully 60 per cent of the world's total supplies of cotton are grown in the United States, and

about 73 per cent of British imports of raw cotton come from that source.

In the years immediately preceding the war the acreage under cotton in America was considerably extended, but the yield per acre was reduced by the ravages of a very serious insect pest, the boll weevil, and the price continued to rise. That this rise in price was due to the increased cost of production was shown by the fluctuations in supply. A good crop caused a sharp fall in prices, and so much of the cotton was produced near the margin of profitable production that a fall in prices caused a restriction of the acreage in the following year; and this restriction of acreage naturally led, in a normal year, to a reduced crop, a rise in prices and an extended acreage again. In the language of economics, the supply showed great elasticity.

The war caused a great decrease in the demand for cotton; and the supply, under the conditions indicated, inevitably shrank correspondingly. Meanwhile, the boll weevil invaded new territories and annexed great areas of the American cotton belt, sadly reducing the yield of the crop. The result of the depredations of this enemy is that it is doubtful whether the American cotton crop will ever again reach its pre-war magnitude, unless improved methods of production, including the defeat of the boll weevil, are devised, or a great permanent rise in prices makes it profitable to increase supplies under the present adverse conditions. When it is remembered that the pre-war supply was not keeping pace with the world's demand, it will be obvious that the position is an anxious one for the manufacturers of cotton goods. There are, no doubt, many countries—

India, Egypt, the Sudan, Mesopotamia, China—which are potentially capable of growing all the cotton which the manufacturing countries may need. Unfortunately, the essential condition upon which the development of these sources of supply depends is the same as that demanded by the American producers: a rise in prices, to compensate for the Law of Diminishing Returns operating, in this case, through the extension of production into less favourable localities.

§ 6. *The Supply of Wool.* Wool, like cotton, fell in price very heavily between 1875 and 1895, but owing to the great development of Australian production, it only rose the average 25 per cent during the years between 1895 and 1910. The war caused a serious diminution in the supply, but there is little doubt that, when the world at last recovers from the paralysing effects of concussion, the pre-war production of wool will be restored. If a great increase of supply is required, it is probable that a tendency to diminishing returns will necessitate a rise in the price of this commodity also. But readers of the first volume in this series will remember that wool is a joint product, subject to special conditions of supply. When Charles Lamb was asked by an agricultural travelling companion what he thought of the prospects of turnips, he replied: "That must depend on boiled mutton." He was thinking of joint demand; but on the supply side, wool depends, even more intimately than turnips, upon mutton. The proportions of the two commodities to one another can be considerably varied by cross-breeding, and it is therefore probable that a small rise in the price of wool

will cause a considerable increase in the quantity produced.

The prospects of the wool supply during, say, the next fifty years, are not therefore so disquieting as those of cotton. Nevertheless, we must remember that the production of this commodity requires great open spaces. The growth of population and transport facilities inevitably lead to the transference of land from pasture to arable and dairy farming. We are concerned with the ebb and flow of the great tides in human progress and must not be deceived by the little waves which advance and recede continually on the fringe of the ocean. Civilization is always encroaching on the pasture lands and driving the shepherds into remoter areas. The River Plate Republics and the United States are reducing their production of wool. Only Australia is still to a small extent on the up-grade. The question arises as to how long it will be before Australia, and even Siberia, grows too populous and accessible for sheep-farming, on anything like its present terms, to remain its most profitable industry. Nobody wants to hold back these countries. We look to them to help to maintain the necessary supply of wheat and other food for human consumption. We want to see them developing and supporting flourishing communities of their own. But the European textile industries are faced by the uncomfortable fact that the food they need for their operatives is competing with the raw material upon which they work, for room to grow in sufficient quantities to satisfy their demand for each of them. The fertile places on the earth which have not already been made to contribute something

towards the maintenance of human life are hard to find. This planet is filling up, and unless mankind makes some sudden leap forward in knowledge and power, it will not be long before a steady permanent fall in real wages warns us that world-population is increasing faster than the world's produce.

The conditions which govern the supply of the other kind of raw materials—those which are raised from mines—will be discussed in the next chapter, and it will be convenient to reserve further consideration of the relations between raw products and population until we are able to lump all the former together.

§ 7. *Fisheries.* Before we pass on from vegetables and animals to minerals, however, mention should be made of a food which has played an important part in history and may become still more influential in the future. This food is "neither flesh nor fowl," but "good red herring."

In years gone by the fisheries were regarded by both Holland and England as "the chiefest trade and gold-mine" and "the way to winne wealth." British fisheries were nursed by kings and statesmen, not only for the food they produced, but because the fishing fleets supplied the finest seamen for the Navy, and because "he that hath the trade of fishing becomes mightier than all the world besides in number of ships."

River-fisheries are undoubtedly subject to the Law of Diminishing Returns, though the English salmon rivers might with a little care be made to yield an increasing return to considerable doses of capital and labour at the present time. As to the sea, opinions differ. A

herring produces about 30,000 eggs, and a plaice may lay as many as half a million. A very large proportion of these eggs are destroyed, and probably only a small minority of little fishes grow to maturity. It is therefore arguable that the capture of grown fishes merely releases space and food for others to replace them. On the other hand, experience seems to show that the stock of plaice in the North Sea has actually been diminished by vigorous fishing operations. Very little is at present known about fish and their way of life, but the question is an important one for, whether they are subject to diminishing returns or not, they constitute an immense self-replenishing reservoir of human food. In the words of an old "Fisher's Song":

> "The husbandman has rent to pay
> (Blow, winds, blow)
> And seed to purchase every day
> (Row, boys, row),
> But he who farms the rolling deeps,
> Though never sowing, always reaps;
> The ocean's fields are fair and free,
> There are no rent days on the sea."

CHAPTER V

COAL AND IRON

"Look unto the rock whence ye were hewn, and to the hole of the pit whence ye were digged."

Isaiah li. 1.

§ 1. *Jevons and the Coal Question.* Another distinguished Englishman, besides John Stuart Mill, realized the temporary character of the great boom in wealth and trade which intoxicated the world in the nineteenth century. In 1865 W. Stanley Jevons gave a shock to British complacency and even, it is said, startled Mr. Gladstone, then Chancellor of the Exchequer, by publishing his book on *The Coal Question: An Inquiry Concerning the Progress of the Nation, and the Probable Exhaustion of our Coal-mines.*

The book is a classic. Other people, including Jevons's own son, have written more exhaustively on the subject, in the light of fuller statistical data. Two Royal Commissions, one appointed especially to investigate the allegations made by Jevons, have sat upon the subject. Subsequent events have confirmed some and falsified other of the prophecies contained in the book. But it still remains the best and most disturbing exposition of the Coal Question and it still seizes the reader's attention as only a work of genius can.

Even a work of genius, however, if it deals with a practical question, must be ruthlessly handled, and Jevons's argument can be summarised as follows:[1]

If Britain at present possesses a certain leading and world-wide influence, it is not due to any general intellectual superiority, but to "the union of certain happy mental qualities with material resources of an altogether peculiar character."

We must apply the Malthusian principle of population to the consumption of coal. "Our subsistence no longer depends upon our produce of corn. The momentous repeal of the Corn Laws throws us from corn upon coal. It marks, at any rate, the epoch when coal was finally recognized as the staple produce of the country; it marks the ascendency of the manufacturing interest, which is only another name for the development of the use of coal."

By virtue of our possession of coal we have made the several quarters of the globe our willing tributaries. "The plains of North America and Russia are our cornfields; Chicago and Odessa our granaries; Canada and the Baltic are our timber-forests; Australasia contains our sheep-farms, and in Argentina and on the western prairies of North America are our herds of oxen; Peru sends her silver, and the gold of South Africa and Australia flows to London; the Hindus and the Chinese grow tea for us, and our coffee, sugar and spice plantations are in all the Indies. Spain and France are our vineyards, and the Mediterranean our fruit-garden; and our cotton grounds, which for long have occupied

[1] The passages between inverted commas are quoted verbatim from Jevons.

the Southern United States, are now being extended everywhere in the warm regions of the earth."

This is what coal has done for us, and " those persons very much mistake the power of coal and steam, and iron, who think that it is now fully felt and exhibited ; it will be almost indefinitely greater in future years than it now is. Science points to this conclusion, and common observation confirms it." But " we should be hasty in assuming that the growth of general commerce ensures for this island everlasting riches and industrial supremacy." We have to remember that, " while other countries mostly subsist upon the annual and ceaseless income of the harvest, we are drawing more and more upon a capital which yields no annual interest, but once turned into light and heat and motive power, is gone for ever into space.

" Rather more than a century of our present progress would exhaust our mines to the depth of 4000 feet, or 1500 feet deeper than our present deepest mine."

If all our coal were brought from an average depth of some 2000 feet, our manufacturers would have to contend with a doubled price of fuel. If the average depth were increased to 4000 feet, a further great but unknown rise in the cost of fuel must be the consequence.

" But I am far from asserting, from these figures, that our coal-fields will be wrought to a depth of 4000 feet in little more than a century.

" I draw the conclusion that I think anyone would draw, that we cannot long maintain our present rate of increase of consumption ; that we can never advance to the higher amounts of consumption supposed. But

this only means that the check to our progress must become perceptible within a century from the present time; that the cost of fuel must rise, perhaps within a lifetime, to a rate injurious to our commercial and manufacturing supremacy; and the conclusion is inevitable, that our present happy progressive condition is a thing of limited duration."

The public seems unaware that "a sudden check to the expansion of our supply would be the very manifestation of exhaustion we dread. It would at once bring on us the rising price, the transference of industry, and the general reverse of prosperity, which we may hope not to witness in our days."

Economy in the use of fuel offers no way out of our difficulty. Economy in the domestic consumption of coal would be a good thing, but would only affect a small portion of the total consumption. "But the economy of coal in manufactures is a different matter. It is wholly a confusion of ideas to suppose that the economical use of fuel is equivalent to a diminished consumption. The very contrary is the truth." The whole history of the steam engine is one of economy, and "the reduction of the consumption of coal, per ton of iron, to less than one-third of its former amount, was followed, in Scotland, by a tenfold total consumption, between the years 1830 and 1863, not to speak of the indirect effect of cheap iron in accelerating other coal-consuming branches of industry."

"The addition to our population in four years now (1865) is as great as the whole increase of the century 1651–1751, and the increase of coal consumption between 1859 and 1862 is equal to the probable annual

consumption at the beginning of this century. It is on this account that I attach less importance than might be thought right to an exact estimate of the coal existing in Great Britain. . . . The absolute amount of coal in the country rather affects the height to which we shall rise than the time for which we shall enjoy the happy prosperity of progress.

"It has been suggested by many random thinkers that when our coal is done here, we may import it as we import so many other raw materials from abroad. . . . I am sorry to say that the least acquaintance with the principles of trade, and the particular circumstances of our trade, furnishes a complete negative to all such notions. While the export of coal is a great and growing branch of our trade, a reversal of the trade, and a future return current of coal, is a commercial impossibility and absurdity. . . . No one will properly understand the trade in coal who forgets that coal is the most bulky and weighty of all commodities. . . . The cost of carriage is the main element of price everywhere except in the coal-field, or its close neighbourhood." If our supplies were imported from America, about 1200 vessels would be required to maintain our present supplies only. "Our industry would then have to contend with fuel, its all-important food, three or four times as dear as it now is in England and America.

"But it is asked, How is a large export trade of coal possible, if an import trade is commercially impossible? . . . It is mainly due to the fact that coal is carried as ballast, or makeweight, and is subject to the low rates of back-carriage. . . . Our imports consist of bulky raw materials and food. . . . A large part of our

shipping would thus have to leave our ports half empty, or in ballast, unless there were some makeweight or natural supply of bulky cargo as back-carriage. . . . To import coal as well as other raw materials would be against the essentially reciprocal nature of trade. The weight of our inward cargoes would be multiplied many times, and but little weight left for outward carriage; almost every influence which now acts, and for centuries has acted, in favour of our maritime and manufacturing success would then act against it, and it would be arrogance and folly indeed to suppose that even Britain can carry forward her industry in spite of nature, and in the want of every material condition. In our successes hitherto it is to nature we owe at least as much as to our own energies."

It is impossible to do justice to Jevons's closely knit argument in a brief summary, but the foregoing sentences from his book may serve the double purpose of conveying some notion of the drift of his thought and at the same time introducing the subject to the reader of this handbook. If anyone is thereby encouraged to read Jevons for himself, he will be amply rewarded.

§ 2. *The Meaning of "Exhaustion."* Although he was a singularly clear writer, Jevons was misunderstood. There seems to be a deeply rooted human instinct to resist a disagreeable truth and to misrepresent its exponents if they cannot be ignored. Just as Malthus was accused of having said that population would increase beyond the means of subsistence, when, in fact, he said that it couldn't; so Jevons was supposed by many people, including both the Royal Commissions

appointed to investigate the question, to have said that the coal consumption of the United Kingdom would reach certain very large amounts, whereas his whole point was that the rate of growth in coal consumption would inevitably be checked.

One of the most vital points to grasp in the study of the rise and fall of human welfare is that put forward by Malthus when he said: "A man who is locked up in a room may fairly be said to be confined by the walls of it, though he may never touch them." This was what Jevons was driving at in connection with the coal supply. "Many people," he wrote, "perhaps entertain a vague notion that some day our coal seams will be found emptied to the bottom, and swept clean like a coal-cellar. Our fires and furnaces, they think, will then be suddenly extinguished, and cold and darkness will be left to reign over a depopulated country. It is almost needless to say, however, that our mines are literally inexhaustible. We cannot get to the bottom of them; and though we may some day have to pay dear for fuel, it will never be positively wanting."

When he discussed the inevitable "exhaustion of our coal-mines," therefore, Jevons meant their depletion to a point at which we could no longer maintain our extraordinary rate of progress. The average annual rate of growth of our coal consumption, at the time when Jevons wrote, was $3\frac{1}{2}$ per cent. If our consumption of coal had continued to multiply at that rate for 110 years, the total amount consumed in that period would have been one hundred thousand million tons. Now the most reliable estimate that Jevons could obtain of the available coal in Britain showed eighty-

three thousand million tons within a depth of 4000 feet. He naturally concluded, therefore, as we have seen, that we could not long maintain that rate of progress.

Within twenty years the rate of growth began to diminish. The average rate of increase during the last forty years has been about 2 per cent per annum. Jevons's anticipation has thus been justified. On the other hand, the estimate, which he adopted, of the available coal in Great Britain has been rejected as too low by later authorities. The Royal Commission which issued its final report in 1905, taking, as Jevons had done, the limit of practicable depth as 4000 feet, estimated the available quantity of coal in the proved coal-fields of the United Kingdom as just over one hundred thousand million tons. Although about six thousand million tons had been raised in the interval, this estimate was nearly eighteen thousand million tons higher than that used by Jevons. The coal-fields of Ireland, which are included in the later estimate and not in the earlier one, are thought to contain less than two hundred million tons, but the excess is accounted for partly by the difference in the areas regarded as productive and partly by new discoveries and more accurate knowledge.

If after another forty years of diligent coal-getting we could hope for a similar increase in the quantity remaining in the earth, we should conclude that we were the happy owners of a widow's cruse and could regard Jevons as a discredited prophet. As, however, that is a supposition which, as Malthus would have said, "cannot be inferred upon any just philosophical grounds,"

we must remember that Jevons himself did not attribute much importance to the accuracy of the estimate in question. "Were our coal half as abundant again," he wrote, "as Mr. Hull (the author of the estimate) states, the effect would only be to defer the climax of our growth perhaps for one generation. And I repeat, *the absolute amount of coal in the country rather affects the height to which we shall rise than the time for which we shall enjoy the happy prosperity of progress.*"

§ 3. *The Influence of Protection.* It is probable that the competition of other countries, especially Germany, has caused British coal production to take a somewhat different course from that anticipated by Jevons. He seems to have expected that the rate of growth would be continued and perhaps accelerated until a sharp rise in price warned the blindest manufacturer that the point of exhaustion was approaching. Germany's coal-fields he passed over as negligible, and though he tended to the other extreme with reference to the United States, over-estimating the coal resources of that country, he regarded her rather as the inevitable successor to Great Britain in the industrial leadership of the world than as an immediate competitor. He could scarcely bring himself to believe that America would persist in a protectionist policy, which he regarded as idiotic. "Its effect upon America," he said, "is to cut it off from intercourse with the rest of the civilized world, to destroy its maritime influence, and to arrest, as far as human interference can arrest, the development of a great state. No doubt it enables a manufacturing interest to grow half a century or more before

its time; but just so much as one interest is forcibly promoted so much are other interests forcibly held back."

This, no doubt, is an extreme expression of the Free Trade view. But there is more in it than most Americans, or even twentieth-century Englishmen, generally suppose. The protection of manufactures in America has starved the country for the benefit of the towns. Everything that the farmer buys is taxed, while the great bulk of his produce is necessarily open to free competition. The result is that capital and labour are diverted from the production of food and cotton and wool to the production of manufactured articles, and the evils which the world and, in the long run, America too, has to fear through the Law of Diminishing Returns are artificially accelerated by state action.[1]

Though Jevons, like the other Free-traders of his time, expected other countries to follow the example of Britain and abolish their import taxes, he recognized that this was by no means certain; and he made a forecast of the effect which the opposite policy would have upon our welfare.

[1] In 1921 an extraordinary twist has been given to American tariff policy by the growing political power of the farmers. The support of the "agricultural block" in Congress for a protectionist policy has been bought by high protective taxes upon wheat, cotton, fruits, wool and practically all the other farm products. As, however, America still exports the more important of these commodities, the import taxes upon them are purely make-believe, and the effect of this development is not, at present, great. The important fact is that American farming interests are making themselves felt in Federal politics and claiming, not free trade, but protection! Thus the manufacturing industry which has been forced into rapid growth in the protectionist hothouse may be checked and hampered by artificial restrictions upon the supply of food and raw materials.

"The rate of our progress and exhaustion," he said, "must depend greatly upon the legislation of colonies and foreign States. Should France revert to a less enlightened commercial policy; should Europe maintain or extend a prohibitory system; should the Northern States succeed in erecting a permanent Morrill tariff for the benefit of Pennsylvanian manufacturers; and should the tendency of all our colonies towards Protection increase, the progress of trade may indeed be vastly retarded. Under these circumstances the present rapid rate of our growth may soon be somewhat checked. The introduction of railways, the repeal of the Corn Laws, the sudden settlement of our Australian colonies, may prove exceptional events. Then, after a period of somewhat painful depression, we may fall into a lower rate of progress, that can be maintained for a lengthened period, passing out of sight."

There is something almost uncanny in the foresight exhibited in this passage. Europe, America and the British Dominions have, as we know, persisted in their policy of protection for manufactures and the result has corresponded closely with that anticipated by Jevons. The lower rate of increase in the consumption of British coal is at present attributable to the competition of other industrial communities, rather than to the approaching exhaustion of our coal-mines.

§ 4. *The World's Coal Reserves.* At the end of last century the world production of coal averaged about six hundred millions of tons a year. By 1913, the output had doubled. Of the twelve hundred millions of tons produced in that year, over 40 per cent were raised in the United States, about 24 per cent in Great Britain and about 15 per cent in Germany. The world's total reserves of hard coal are estimated at about four

billions (4,000,000,000,000) of tons; enough for more than three thousand years at the present rate of consumption. About half of these reserves are attributed to the United States; a quarter to China, and rather more than a fifth to Europe. Within Europe, pre-war Germany claimed more than half, and Britain a quarter of the reserves of available coal. It is said that American coal-fields would last, *at the present rate of production* (not, be it noted, on Jevons's basis of the rate of *increase*), for twelve to fifteen centuries. The great bulk of China's coal is in the Shansi field in the far interior; this has only been scratched as yet, but it may become vastly important in years to come. Her more accessible mines, nearer the coast, are not expected to last very long, if they are thoroughly worked.

On the basis of the production of coal in 1900, a German expert expressed the opinion that "in 100 to 200 years the coal-fields of Central France, Central Bohemia, the Kingdom of Saxony, and the North of England would be exhausted; in 250 years the other British coal-fields, the Waldenburg-Schalzlar coal-field, and that of the North of France; in 600 to 800 years the coal-fields of Saarbrucken, Belgium, Aachen and Westphalia; and in more than 1000 years the coal-fields of Upper Silesia."[1]

A more recent estimate is that "at the rate of production of 1913, Britain had supplies only for five or six centuries, Germany for eighteen to twenty."[2]

The divergence between these estimates need not

[1] P. Frech, quoted in Part XI of Appendices to the Final Report of the Royal Commission of 1901.

[2] Prof. A. J. Sargent, *Coal in International Trade*, p. 16.

detain us. The figures have no significance except as a broad indication of the magnitude of the supplies available in different parts of the world. No one would venture to predict the rate at which coal will be raised and consumed during the next fifty years. But a variation in the rate, of course, makes all the difference to the length of time that the reserves will last. In the fifteen years before the war the world's output of coal doubled. If it doubled every fifteen years until 1995, the consumption in that year would be at a rate which, if continued, would exhaust the world's supposed reserves in about one hundred years, instead of spreading them over three thousand years!

It is obvious, therefore, that the rate of increase in the consumption of coal must decline before many years have passed, not only in Great Britain, but in America also, and in the world as a whole. The spirit of man is so competitive that this fact is likely to be received quite calmly, if not with jubilation, while the relative decline of one's own country would give rise to alarm. Progress is measured not by any absolute standard of well-being, but by a relative superiority over other countries. There is perhaps some justification for this method of calculation in the mechanism of international trade.

Even from this point of view, however, the position of Europe in general and of Great Britain in particular is a disquieting one. For, while it is quite possible that the mines of America may be exhausted as rapidly as those of Europe, the "height to which she may rise" (to use Jevons's phrase) greatly exceeds that which can be attained by the Old World. She is thought to

possess at least half the reserves of hard coal, and over 90 per cent of the reserves of lignite. She is already responsible for nearly half the world's production of the former commodity. A large part of her supplies are easily raised ; so that just before the war the output per person employed in the coal-mining industry was nearly 680 tons in a year in the United States, as against 260 tons in Great Britain and 270 in Germany. The war increased this advantage considerably ; Germany's coal production being, of course, completely disorganized by the Peace Treaty, while British costs quadrupled and American costs only doubled, between 1913 and 1921.

§ 5. *The Export Trade in Coal.* Since American coal can at present be raised so much more cheaply than British coal, it might be supposed that America was now in a position to capture the whole of the export trade in coal. This, however, does not necessarily follow. The question of shipping freights is extremely important with respect to so bulky a commodity. The distance of America from European markets thus places a handicap upon that country in competing with Great Britain there, which may counterbalance her advantage in initial costs ; while other markets, such as those of South America and the Far East, may be preserved to Great Britain by another factor upon which Jevons laid much emphasis. Great Britain still imports large quantities of bulky commodities—food-stuffs and raw materials—and, as the world settles down, shipowners are again finding it necessary to carry British coal abroad at low freights, as make-weight or back-carriage.

Even if Great Britain retains the whole of her pre-war export of coal in bulk, however, she must still feel the competition of American coal very keenly through its use in industry. If coal is in the future to be as important a factor in the production of manufactured articles as it has been in the past, it will be difficult for Europe to hold its own against the New World. But it is sometimes said that the influence of coal in the world is waning. Rival sources of energy are coming into prominence. What, then, are the known substitutes for coal? How will these affect the distribution of the world's wealth? These are questions which will naturally occur to the reader, and they must be answered as far as our present knowledge permits.

§ 6. *Substitutes for Coal.* Oil and water are the two sources of power most talked about nowadays.

In 1873 the world production of crude oil was less than 1,500,000 tons; in 1913 it was rather over fifty millions of tons; in 1920 it was well over ninety millions of tons. The United States produced 64 per cent of the world's supply in 1920 and Mexico 22 per cent. The actual exhaustion of America's oil-fields is said to be in sight. An official estimate gives them twenty years of life. The reserves of coal are estimated in centuries. The life of an oil-well is reckoned in months. While, therefore, there are no reliable data as to the world's oil resources, it seems likely that we may be reduced to the use of shale-oil long before our coal reserves are seriously depleted. Meanwhile, the United States have the temporary advantage in this fuel also, and Mexico,

her near neighbour, will be able to supplement her supplies.

In water-power America has not so great an advantage over Europe. An official estimate for the United States in 1912 gives a maximum of over sixty million horse-power and a minimum of over thirty millions. The horse-power of Niagara is about six millions, and this is the equivalent of about thirty millions of tons of coal a year. The total water-power that the States claim to possess would, therefore, be the equivalent of from 300 to 150 millions of tons of coal a year. It is thought by some British authorities that this estimate is very excessive. The most conservative, however, would allow that North America as a whole has effective reserves of water-power equivalent to the saving of 100 to 150 millions of tons of coal a year on the present basis of consumption.[1] This represents no more than a quarter of the present annual production of coal by the United States; and when we remember that a large part of the water-power is in the far west and that it cannot be economically distributed far from its source, it will appear that even America's great rivers and waterfalls do not provide a satisfactory substitute for coal.

The whole of Central and Western Europe together has probably from twenty to thirty million horse-power available in water energy; the equivalent of at least a hundred million tons of coal a year. The Alps and the mountains of Norway and Sweden are the chief sources of power. Germany is said to possess only a million and a half and Great Britain only one million horse-power.

[1] Prof. A. J. Sargent, *Coal in International Trade*, p. 64.

As in America, so in Europe, the water-power is mainly located at long distances from the coal-fields and therefore from the present centres of industry. These distances are, however, much greater in America than in Europe, and the countries which converge upon the Alps have therefore a potential source of power which may partly compensate them for their inferiority in reserves of coal.

No consolation of this kind is open to Great Britain, whose insignificant reserves of water-power are scattered about in the least accessible parts of the island ; unless, indeed, a way is found of harnessing the tides which ebb and flow unceasingly around her shores.

In general, it may be said that the resources of science and industry are not likely to be defeated by the problem of devising some adequate substitute for coal to carry on the business of the world when that good workman is at last exhausted by his labours. Jevons saw no prospect of prolonging the life of coal by economies in the use of fuel, because the fruits of such economies were invariably taken out at once in the extension of industry. No doubt he was right in the circumstances of his own period. As coal grows scarcer, however, and its price rises, economies will be forced upon us. Industries which would otherwise have to close down through inability to meet the increasing cost of coal will be maintained by electricity. Coal will still, no doubt, have to be used to generate the electricity, where water-power is not available ; but a considerable saving in coal will be effected by such means ;[1] and it

[1] "If power supply in the United Kingdom were dealt with on comprehensive lines and advantage taken of the most modern

will be a real saving, by which the date of ultimate exhaustion may be indefinitely postponed.

Though, however, it would be silly to be much disturbed by the fear that the world may one day be deprived of fuel, the problems raised by the *relative* disadvantage of Europe in regard to fuel at the present time are very real and pressing. In order that we may see this disadvantage in its true proportions, it is necessary to take account of another mineral, coal's great ally in the domination of the world—iron.

§ 7. *Iron.* It used to be thought by large numbers of Englishmen that the presence of coal and iron near together in various parts of Britain was specially arranged by Providence for the convenience of the inhabitants. Certainly this proximity gave the iron trade of Great Britain a good start and helped to build the railways and ships which now carry the ore to the fuel from comparatively distant places. At present, however, Providence seems to be on the side of the United States. About 85 per cent of the ore mined in that country comes from the shores of Lake Superior and is carried in steamers down to Lake Erie, where it is either met by the coal or forwarded by rail to Pittsburg. In 1913 the United States produced over 40 per cent of the world's pig-iron. Between 1900 and 1913 her output rose from fourteen to over thirty millions of tons, while that of Germany rose from eight to

engineering development, the saving in coal throughout the country would, in the near future, amount to 55,000,000 tons per annum on the present output of manufactured products."—"Final Report of the Coal Conservation Committee to the Ministry of Reconstruction," Cd. 9084 (1918).

twenty millions and that of Great Britain from nine to a little over ten millions. Pre-war Germany obtained most of her iron-ore from Lorraine and the rest from Luxemburg, the Briey district in France, Sweden and Spain. Great Britain produced two-thirds of the ore she consumed and imported the rest from Sweden and Spain.

Americans claim that they have about seventy-five thousand millions of tons of high-grade ores in the Lake Superior district, and three or four times that quantity of low-grade ores. At the present rate of consumption these would last for three or four thousand years.

In Europe, the geologists estimate that there are over fifty thousand millions of tons of workable ore. Most of this, however, is not of high grade. It is, of course, the richest and most easily worked deposits which are exhausted first. There are, for instance, very large reserves of low-grade ores in Great Britain, which we may fall back upon when the richer ores of Sweden and Spain are so far exhausted that their price becomes prohibitive. The fact that we at present import a large part of our supply shows that the difference in quality is sufficiently important to outweigh the cost of carrying a very heavy freight.

It will be seen that in respect to iron, as well as coal, America has natural advantages over Europe which are likely to increase in the years to come. It is inevitable that in the production of manufactured articles in which these two minerals are both important factors, the teeming population of the Old World should feel the difficulty of competing against the immense resources

of the New for the food and raw materials upon which life itself depends.

§ 8. *Great Britain's Problem.* Central Europe is for the time being submerged in the mire of post-war difficulties; no one can foresee what the future of those populous districts may be. But Great Britain is struggling back to her normal economic life. Let us then consider how Great Britain stands in relation to the supplies of food, fuel and raw material upon which she depends in a unique degree for the support of her great population.

For nearly two-thirds of our food we depend upon other countries. The supply, however, is elastic, that is to say, a slight increase in the price is likely to call forth considerably increased supplies. For these great imports of food we have to pay by our exports, which consist mainly of manufactured goods, coal and services (shipping, banking, insurance, etc.). For our manufactures we require raw materials, most of which we have to import. The most essential of these are cotton, which is rising in price and inelastic in supply; wool, which is fairly plentiful at present but depends upon great open spaces in the world and is subject to encroachments by arable and dairy farming; iron ore, of which we import from a third to a half of our supply, though we have great deposits of low-grade ores in our own soil; and coal, which we produce ourselves and export largely in bulk in addition to using it as a most important ingredient in our manufactures.

The question which we have to consider is whether a rapidly increasing population can be supported by

industries which depend upon imported raw materials at rising prices, and coal produced at home with increasing difficulty, in competition with similar industries in America which have greater natural advantages.

Before we can answer that question, we must comprehend the nature of international trade. Two countries trade with one another when they have different *comparative* advantages in producing goods. If a given quantity of capital and labour could produce just twice as much wheat and twice as much pig-iron in America as in England, there would be no point in trading in those two commodities between the two countries. But if the same quantities of capital and labour produced twice as much wheat and only one and a half times as much pig-iron in America, it would be profitable to both countries to exchange American wheat for British pig-iron. This is a simple illustration of what is called the Law of Comparative Costs. The important point is that a country may, and often does, export goods in the production of which it is at an absolute disadvantage as compared with the country to which it sends them.

International trade is, in practice, a complex series of operations in which many nations are involved. The simple case that we have taken will, however, enable us to tackle the question with which we are now concerned.

The answer is that Great Britain *can* continue to compete with America *on certain terms.* Hitherto, as we have seen, her international trade has been carried on in comparatively favourable circumstances. The rapid development of new sources of food and raw

materials has enabled her industries to expand and at the same time to exchange their products on increasingly advantageous terms, with agricultural countries. Now there are signs of a change, and Great Britain may have to adjust herself to new conditions. If she cannot maintain her trade by superior skill or greater energy and enterprise, she must do so by cutting costs, *including labour costs.* It serves no good purpose to ignore unpleasant facts. A fall in the standard of living is one of the greatest calamities which a nation may have to face. But the less it is foreseen the greater is the misery to which it gives rise. The danger is that the population of Europe in general and of Great Britain in particular may go on increasing almost automatically when the field for employment on a decent level of subsistence is contracting. Emigration, as we shall see in the next chapter, offers a very poor measure of relief under such circumstances. But a well-organized nation that looks ahead and lays its plans well should be able to adjust itself to changing circumstances with the minimum of suffering and hardship.

Jevons put upon his title-page the following quotation from Adam Smith :

"The progressive state is in reality the cheerful and the hearty state to all the different orders of the society ; the stationary is dull ; the declining melancholy."

No doubt there is a measure of truth in the statement. But the progressive state is also one of discontent and inequality, when the rich tend to grow richer and the poor relatively, if not absolutely, poorer. We have been so busy accumulating wealth and rushing about the earth in vehicles of increasing velocity that we have

paid too little attention to the wise use of the things we have acquired. The stationary state, if it is to that we are coming, may prove to be not dull, but tranquil; a state in which we may for the first time taste the pleasures of a true civilization. There is plenty of hope for the future, if we face the situation in which we find ourselves with courage and wisdom. But one thing is essential if a stationary state is to be tolerable—it must be accompanied by a stationary population.

CHAPTER VI

THE GROWTH OF POPULATION

"Desire not a multitude of unprofitable children."
Ecclesiasticus xvi. 1.

§ 1. *Changes in the Birth-rate.* "Russia being mentioned as likely to become a great empire, by the rapid increase of population: Johnson, 'Why, Sir, I see no prospect of their propagating more. They can have no more children than they can get. I know of no way to make them breed more than they do. It is not from reason and prudence that people marry, but from inclination. A man is poor; he thinks, "I cannot be worse, and so I'll e'en take Peggy."' Boswell, 'But have not nations been more populous at one period than another?' Johnson, 'Yes, Sir; but that has been owing to the people being less thinned at one period than another, whether by emigrations, war, or pestilence, not by their being more or less prolifick. Births at all times bear the same proportion to the same number of people.'"

Hazlitt put this quotation in the forefront of his *Reply to Malthus.* How he thought it damaged the Malthusian doctrine is not clear, but he evidently regarded it as an example of the highest wisdom. Mr. G. Udny Yule, the statistician, on the other hand, says that to him "this remarkable dictum appears to be contradicted by the experience of every nation for which

we have records over a sufficient period of time and of sufficient accuracy."[1]

Now statistics, especially "vital statistics," as the figures about births, deaths and marriages, are called—are full of pitfalls; and the present writer is by no means anxious to challenge a statistician upon his own ground. No doubt Mr. Yule is right in denying the accuracy of Dr. Johnson's statement. Nevertheless, it seems to have been inspired by the robust common sense for which the speaker was conspicuous, and, allowing for that exaggeration which is permissible in conversation, to have been broadly true. Since about 1880 it has ceased to be true of countries under the influence of Western civilization. That is a fact of the greatest importance which we shall consider in the latter part of this chapter. The change is due to influences of which Dr. Johnson knew nothing, and it is hardly admissible as evidence against him.

Going back for a moment to Gregory King, the ingenious Lancaster Herald, from whose observations upon the state of England in 1696 some extracts were given in Chapter I, we may note that his estimate of the yearly births of the kingdom amounted to one in twenty-eight of the total population. In order to bring it into comparison with more recent figures, we may translate this estimate into 35·75 per 1000.

Now the civil registration of births was not established until 1837, and registration was not compulsory until 1874, but the following figures are likely to be more accurate than those of Gregory King. These are the annual birth-rates recorded for England and Wales:

[1] *The Fall of the Birth-rate*, by G. Udny Yule, M.A.

Period.	Births per 1000 living at all ages.
1841–50	34·6
1851–55	33·9
1856–60	34·4
1861–65	35·1
1866–70	35·3
1871–75	35·5
1876–80	35·3
1881–85	33·5
1886–90	31·4
1891–95	30·5
1896–00	29·3
1901–05	28·2
1906–10	26·3
1911–15	23·6

Statisticians warn us against attaching too much importance to the rise in the birth-rate before 1876, as it is uncertain how far it may be due to increasing completeness of registration. With the fall after 1880 we shall be concerned later. The point to which the reader's attention should be given at present is the remarkable correspondence between the estimate of Gregory King of the birth-rate in 1696 with the rates actually recorded between 1841 and 1880.

It is true, of course, that small changes in the number of births per 1000 of the population make a very considerable difference in the total population. Between 1861 and 1871 the number of persons in Great Britain increased from twenty-three millions to twenty-six millions. If, therefore, one more baby was born each year to every thousand people living, the additional

births in those ten years amounted to about a quarter of a million. Nevertheless, when compared with the change in the death-rate this possible variation in the birth-rate is slight, and we are cautioned not to assume that it actually took place.

§ 2. *Changes in the Death-rate.* Gregory King said that the annual burials in his time were about one in thirty-two, and to these he added another ten thousand deaths per annum as an allowance for plagues, wars and shipwrecks. This addition makes the estimate of deaths about one in thirty, or 33·3 per 1000, nearly equal to the birth-rate during the nineteenth century !

Compare this with the annual death-rate since 1851 :

Period	Deaths per 1000 living at all ages	Deaths of Infants under one year per 1000 births
1851–55	22·7	156
1856–60	21·8	152
1861–65	22·6	151
1866–70	22·4	157
1871–75	22·0	153
1876–80	20·8	145
1881–85	19.4	139
1886–90	18·9	145
1891–95	18·7	151
1896–00	17·7	156
1901–05	16·0	138
1906-10	14·7	117
1911–15	14·3	110

It will be seen that if King's estimate was approximately correct, there was a fall of one-third in the

death-rate between 1696 and 1851, and that it has declined continuously since 1861–65, making altogether another fall of over one-third. The figures for the deaths of infants under one year are also given, because it is among these that the highest mortality occurs. It is remarkable that there was no great improvement in this respect until the turn of the century.

§ 3. *The Relative Influence of Birth-rate and Death-rate upon the Growth of Population.* Now it is possible that Gregory King's estimates may have been hopelessly wrong. He may have grossly overestimated both the birth-rate and the death-rate. If, indeed, he erred in one, he must have erred in both, for the growth of population in the seventeenth and eighteenth centuries corresponds roughly with the rate of increase which would result from his figures. In 1600 the population of England and Wales is thought to have been about five millions; in 1700 about five and a half millions; in 1750 about six and a half millions; in 1800 eight million nine hundred thousand; in 1901 thirty-two and a half millions. It is clear that the birth-rate and death-rate must have been nearly equal throughout the seventeenth century, and that since 1750 there must have been a great increase in the birth-rate or a great decline in the death-rate, or both.

Sweden is the only country that has kept reliable vital statistics for a long period. It will be useful therefore to look at the evidence which that country can give respecting variations in the birth-rate. The following are the legitimate births per 1000 married women aged 15 to 50 in Sweden:

1756–65	251	1836–45	235
1766–75	240	1846–55	241
1776–85	242	1856–65	248
1786–95	245	1866–75	235
1796–05	232	1876–85	240
1806–15	232	1886–95	231
1816–25	253	1896–05	219
1826–35	240		

It will be seen that though the figures are not constant, the variations are irregular and inconsiderable until the sudden drop in the last period.

Sweden being a peaceful and established country, with a large emigration may reasonably be expected to have a steady birth-rate. Let us, therefore, take Australasia as a final illustration on this point. Here are the birth-rate and death-rate for forty years :

Period	Birth-rate	Death-rate	Natural Increase
1861–65	41·92	16·75	25·17
1866–70	39·84	15·62	24·22
1871–75	37·34	15·26	22·08
1876–80	36·38	15·04	21·34
1881–85	35·21	14·79	20·42
1886–90	34·43	13·95	20·48
1891–95	31·52	12·74	18·78
1896–00	27·35	12·39	14·96
1901–09	26·35	—	—

Here it will be seen that the birth-rate has declined more rapidly and to a greater extent than the death-rate. Dr. Johnson's dictum ceases apparently to have any validity whatever when Australasia is considered. There are, however, special circumstances to account

for the high level of this birth-rate in the years 1861 to 1875, which justify us in regarding it as abnormal. There was a wave of immigration into Australia in the 'fifties and 'sixties, and it is undeniable that healthy immigrants cause a temporary increase in the birth-rate and decrease in the death-rate. This result is due to a change in the composition of the population. The birth-rate jumps up because a larger proportion of the people are at the child-producing ages. The death-rate declines because the population as a whole is younger than in established countries. It will be observed that between 1880 and 1890, when the effect of the great immigration had worked itself out, the birth-rate became comparable to that of England and Wales.

It is much to be regretted that America has not recorded its vital statistics until quite recently, since they might have thrown a flood of light upon that great boom in population which impressed Malthus and his contemporaries at the end of the eighteenth century.

Without going further into the evidence, it may be tentatively asserted that the tremendous increase in the population of Europe and America during the last century and a half is attributable far more to a diminished death-rate than to a change in the birth-rate. "Poverty," said Adam Smith, in a passage quoted above (in Chapter I), ". . . seems even to be favourable to generation. A half-starved Highland woman frequently bears more than twenty children, while a pampered fine lady is often incapable of bearing any, and is generally exhausted by two or three. . . . But poverty, though it does not prevent the generation, is extremely unfavourable to the rearing of children.

. . . It is not uncommon, I have been frequently told, in the Highlands of Scotland, for a mother who had borne twenty children not to have two alive. . . ."

§ 4. *Preventive Checks to Population.* Curiously enough, Western civilization seems, until the last few years, to have diminished what Malthus called "the preventive check" to population and to have encouraged people, especially poor people, to bring more children into the world than the soil could support. Mr. Carr-Saunders has collected[1] a mass of evidence showing that everywhere among primitive races either abortion, infanticide or prolonged abstention from intercourse are practised in such a degree as greatly to restrict increase in population. Up to the mediæval period one or other of these methods was prevalent in all countries. They were then replaced, in Europe, by postponement of marriage. The social customs throughout Europe in the Middle Ages seem to have tended to discourage matrimony in early life. The unmarried labourer lived at the farmhouse or with his parents, and had to wait for a cottage to become vacant through death before he could set up an establishment of his own. Migration was not generally permitted, nor were the opportunities of employment away from home such as to encourage wanderings. The servants of the nobility, it is true, were an exception to this rule. They were sometimes moved about, but, like domestic servants nowadays, they tended to be a celibate class. Under these circumstances most men and women married rather late in life, and many did not have a chance of marrying at all. The religious Orders became

[1] In *The Population Problem*, by A. M. Carr-Saunders.

a refuge for some of these involuntary celibates, and drew others, who could have married, into their folds.

Perhaps the preventive checks of primitive society became unnecessary through the accidental growth of these social restraints, and the stationary population of the Middle Ages caused men to forget the miseries of over-population. Perhaps the teaching of the Catholic Church in favour of large families and the dictum of Luther, "Let God provide," played a dominant part in social history. Perhaps the demand for soldiers to fight the battles of kings and emperors led to a relaxation of the customs which interfered with marriage. Or perhaps the growth of industries, other than agriculture, opened the door for migration and created a new demand for labour. All these influences may indeed have played a part in bringing about that unrestrained birth-rate which Dr. Johnson regarded as normal to humanity.

§ 5. *Under-Population.* It may here be asked why we so seldom speak of the evil of under-population. It is obvious, for instance, that America is a much better country to live in now that it has a hundred millions of inhabitants than it was when there were only a few thousands, or even when there were a few millions. Was it not under-populated, then ?

The answer is that the power of population is so great that it will very rapidly fill up any opening which may appear for its expansion. Between 1906 and 1911 the population of the world increased at such a rate that it would double in about sixty years ; and it has been calculated that, at the same rate, the present world population of 1,694,000,000 might proceed from one

couple in 1782 years. America is really a striking example of the reproductive energy of the human race. The development of a country takes time. To dump a hundred millions, or even ten millions, of people on the virgin soil of America all at once would have caused the death by starvation of the great majority of them. The settlers had to be provided with implements, and an immense and intricate mechanism had to grow up for supplying them with the products of Europe while they were developing the resources of a new continent. At every stage in the evolution of America enough people were forthcoming both there and in Europe to facilitate the greatest possible rate of progress. The opening up of a new source of subsistence has called forth an immense increase in numbers not only in America itself, but in Europe also. Could there be a more impressive demonstration of the truth of the Malthusian doctrine? It is quite true that many parts of the world have become better to live in as the number of inhabitants has increased, but this has been due, not to the increase alone, but to the improved methods of production which man in co-operation has learned to practise. At each stage of development the population has been at least as great as could be maintained without depressing the standard of life.

§ 6. *A Falling Birth-rate.* Now if, as has been suggested in the foregoing chapters, the extraordinary demand for population, occasioned by the development of America, has been largely met, how is the rate of increase to be checked? Must we choose between the primitive check of infanticide, the mediæval check of

late marriage and enforced celibacy, or the positive check of a high death-rate, especially among infants? A happier solution than any of these seems to be indicated by the statistics quoted at the beginning of this chapter. From them we learnt that the birth-rate in England and Wales has fallen since 1876 by about one-third, while the death-rate has fallen almost as much as the birth-rate. The diminished mortality has nearly compensated so far for the smaller number of births, the "natural rate of increase"—that is, the excess of births over deaths—having fallen only from a maximum of 14 for the decade 1871–80 to 11·8 for 1900–10. The death-rate, however, cannot fall to zero, unless Godwin's dream is realized and we live for ever; so if the birth-rate continues to fall, the rate of increase must diminish and eventually become a rate of decrease.

This phenomenon of a falling birth-rate has not been confined to England, but has been experienced to some extent in every country in Europe, and even in most parts of the New World where Europeans have settled. In France the birth-rate has been falling since the beginning of the nineteenth century. In 1811–20 the average rate was 31·8 in that country; in 1841–50 it was 27·4; in 1871–80 it was 25·4; and in 1901–10 it was 20·6. The population in France has been practically stationary for the last thirty years. This is altogether an exceptional case. France, being to a large extent a self-supporting country, has stood aside from the influence of American expansion which has stimulated the rate of increase in most other countries. The French are a saving people, and the instinct of accumulation inclines men to have small families. Moreover, the law

which provides for a division of landed property at death is said to exert a considerable influence in the same direction, since men do not wish their farms to be cut up into small parcels.

In many other countries a fall in the birth-rate has been a conspicuous feature of the last forty or fifty years. Between 1871–80 and 1901–10 the rate fell in Denmark from 31·4 to 28·6 ; in Norway, from 31·0 to 27·4 ; in Sweden, from 30·5 to 25·8 ; in Finland, from 37·0 to 31·2 ; in Austria, from 39·0 to 34·7 ; in Switzerland from 30·7 to 26·9 ; in Germany, from 39·1 to 32·9 ; in Holland, from 36·2 to 30·5 ; in Belgium, from 32·3 to 26·1 ; in Italy, from 36·9 to 32·7 ; in Australia, from 36·1 to 26·5 ; and in New Zealand, from 40·5 to 26·8.

The United States, as we have already remarked, does not possess records of births, deaths and marriages, but the approximate figures for the total population are available for each decade since 1800. They are as follows :—

	Millions.	Increase per cent.
1800	5·3	—
1810	7·2	36
1820	9·6	33
1830	12·9	34
1840	17·1	33
1850	23·2	36
1860	31·4	36
1870	38·5	23
1880	50·1	30
1890	62·6	25
1900	75·7	21
1910	91·9	21
1920	105·7	15

Without going into further figures, it may be confidently asserted that this falling off in the rate of increase cannot be explained, though it may be slightly modified, by changes in the immigration rate. There is no doubt that the general decline in the birth-rate is effective in the United States, as well as in Europe and the British Dominions.

§ 7. *Some Explanations of the Decline in the Birth-rate.* Returning to the position in England, all statisticians seem to be agreed that this declining birth-rate is mainly due to a decrease in the number of children in the average family. This may be partly caused by postponement of marriage; but, while about 17 per cent may be attributed to this cause, about 70 per cent is due to a decrease in the fertility of married women.

Here the agreement ends. Everyone is entitled to his own opinion as to the cause of the decline, which all admit has taken place. Mr. Yule has an interesting theory that the birth-rate falls in sympathy with falling prices. "That the nexus is economic, and that it probably operates via psychology rather than directly through physiology." He doubts—in fact, he disbelieves—its being wholly conscious, or, as the phrase now goes, "volitional."[1] Another statistical philosopher makes the flattering suggestion that fluctuations in human fertility are analogous to those outbursts of vital energy which lead to plagues of field-mice or locusts. Very little is known, apparently, about the causes of these exuberant manifestations of life, but a

[1] *The Fall of the Birth-rate*, p. 39.

similar eccentricity has been observed in some species of fish, and in this case a Norwegian scientist, Dr. J. Hjort, has found a satisfactory explanation. In 1908 Dr. Hjort noticed that nearly all the cod—whose ages can be learned from their scales—caught by his countrymen were hatched in 1904. Again, in 1913 he observed an extraordinary number of one-year-old cod on the coast of Norway, and the 1912 brood has since been found to preponderate greatly in the catches. Investigating this apparent fluctuation in fertility, Dr. Hjort discovered that the diatoms upon which the tiny cod feed when they first hatch out vary very greatly in their density ; and he believes that in the years 1904 and 1912 a large quantity of these diatoms happened to be available when the baby cod began to feed, with the result that an unusually large proportion survived. Now, if any explanation of this kind is applicable to the field-mice and the locusts, the analogy with those interesting organisms will merely bring us back again to the Malthusian hypothesis that population increases up to the means of subsistence.

The explanation of the falling birth-rate which is most widely accepted is that since 1877 the knowledge of the means by which married people can deliberately prevent the conception of children has been rapidly disseminated and used. There is strong circumstantial evidence in favour of this view. In 1877, Bradlaugh and Mrs. Besant were prosecuted for publishing a pamphlet written by a Dr. Knowlton, in which information of the kind was given. This trial attracted a tremendous amount of public interest. There can be no doubt that the subject-matter of the pamphlet received an extra-

ordinary advertisement, or that the fall in the birth-rate coincides in a remarkable way with the date of the trial. Moreover, there is evidence that the practices which were thus made known for the first time to great numbers of people in England had been prevalent in France for many years before, and the account which has been given above of the motives which may have led the French people to restrict their population can thus be supplemented by the information that the means of doing so were available to them.

§ 8. *Variations in the Birth-rate between Different Classes.* If, however, we accept the view that the fall in the birth-rate is mainly due to the deliberate action of married people, we have still to consider what motives may have caused them to take that action in countries other than France during the last forty or fifty years. Here another factor of first-rate importance presents itself. The decrease in fertility has not affected all classes in the community equally. At the present time the birth-rate is lowest in what are called the upper and middle classes, and rises, generally speaking, inversely with the average earnings of each class in the community. The people, however, in certain industries do not conform to this gradation. Textile workers, for instance, have as few children as the middle classes; while miners have the largest number of all—more than the unskilled labourers. The difference in the fertility of different classes is much greater now than it was fifty years ago, but there is some evidence that it is beginning to decrease again. In enquiring into the causes of a falling birth-rate we have, therefore, the clue to follow that, in general, they act

more strongly upon the rich than the poor, and that they have more influence upon skilled workmen, other than miners, than upon unskilled.

In order to get this clue in its right perspective, however, it should be observed that the working classes have always—or, at any rate, for many years—married younger and had more children than the middle classes. An unskilled or partly skilled workman earns as much when he is twenty-one as he is likely to earn when he is forty, and his children do not get an expensive education; but a lawyer or a doctor is seldom in receipt of sufficient income from his profession to maintain a wife and family until he approaches thirty, and he may find it very difficult to educate his children in the way he considers necessary until he is well over forty. The difference between classes in the production of children must not therefore be regarded as a new development coincident with the falling birth-rate, though it has certainly been accentuated during the last forty years. The birth-rate among textile workers, again, has been lower than that in other industries for many years, and this difference also must therefore be discounted in following the clue to the recent change.

Now, extremely poor people are notoriously careless as to the future. If they get a short burst of high wages, by making munitions in wartime, for instance, they are apt to spend recklessly and to relapse into their former condition as soon as the burst is over. On the other hand, it has frequently been noticed that when a community, or a class, has attained a decent standard of life and has maintained it for a time, it is extremely tenacious of that standard. If, then, we can discover

that for some reason the people of this and other European countries have increased the number of things which they consider necessary to a tolerable existence during the period under review, we shall have supplied at least one reason for their smaller families.

The growing wealth of Europe during the latter part of the nineteenth century does not in itself provide the evidence we require, for why was not that wealth taken out in mere numbers, in accordance with the Malthusian principle ? The answer seems to be that people decide whether or not they can afford to have children on a calculation of their money incomes, without considering changes in purchasing power ; and that, consequently, falling prices tend to produce a higher standard of life instead of more children. Prices fell continuously and considerably during the 'eighties, and the same money incomes therefore enabled people to buy more things without feeling richer, and they thus became accustomed to living upon a scale which could only be maintained with smaller families.

§ 9. *Other Factors Influencing the Birth-rate.* Here, then, is one probable cause of the fall in the birth-rate. Is it the sole cause ? To attribute complex results to single causes is said to be the characteristic vice of untrained and narrow minds ; it is certainly a fruitful source of error. This population problem is highly complex. It depends upon human psychology, which may be influenced by a thousand different, and sometimes conflicting, impulses, rational and irrational. It would therefore be foolish to be dogmatic about the matter. One can only say that certain influences have

been at work and that they have probably contributed to certain results. It is not possible, even, to discuss all the evidence, or to state fully the case for the view which has been put forward above. The importance attributed to the deliberate limitation of families as a cause of the falling birth-rate receives, for instance, some additional justification from statistics showing that Roman Catholics tend to have more children than Protestants in similar circumstances, for the Roman Church has strenuously opposed the practice of birth control. It is not necessary, however, to labour the point, for the reader who wishes to reach any final conclusion will pursue the subject far beyond the scope of this handbook.

Another factor which may have had an enormous influence upon the birth-rate is the change in the social status of women. Mill, who is much more illuminating upon population problems than the later economists, remarked that

"it is seldom by the choice of the wife that families are too numerous; on her devolves (along with all the physical suffering and at least a full share of the privations) the whole of the intolerable domestic drudgery resulting from the excess. To be relieved from it would be hailed as a blessing by multitudes of women who now never venture to urge such a claim, but who would urge it, if supported by the moral feelings of the community. . . . Let them cease to be confined by custom to one physical function as their means of living and their source of influence, and they would have for the first time an equal voice with men in what concerns that function: and of all the improvements in reserve for mankind which it is now possible to foresee, none might be expected to be so fertile as this in almost every kind of moral and social benefit."

Here, then, is a social force which may well have played as big a part as the rise in the standard of life in diminishing the birth-rate and, with it, the death-rate. The position of women, especially in the middle classes where the limitation of families has been most marked, has changed greatly during the last fifty years. Not only have they entered into competition with men in many callings, but the subtler difference of status in home life is even more significant. Anyone who has read an early Victorian novel, or even the works of Dickens, will know, if he be not devoid of imagination, that Mill's forecast of the benefits to be derived from the change was not in the least exaggerated. "Almost every kind of moral and social benefit" may, indeed, spring from the admission of women to an equal share with men in the direction of human affairs; and not the least of these may prove to be a rational limitation of the birth-rate. It is possible also that the small families of the textile workers may be accounted for by the status of women as wage-earners among them; while the position of women in the isolated mining districts may equally explain the enormous birth-rate there.

§ 10. *The Importance of the Decline in the Birth-rate.* To whatever causes we may attribute the fall in the birth-rate, the most important fact from the economic standpoint is that it has fallen and is likely to fall still more. Changes in the size of the population are necessary from time to time, because changes take place in the natural resources upon which human beings depend. The necessary adjustment may be forced upon us, with

infinite pain and misery, through the death-rate, or it may be brought about, if man will exercise his prerogative as a rational creature, through the birth-rate. It is an obvious fact that the same rate of increase may be produced in a community by a high birth-rate combined with a high death-rate as by a low birth-rate and a low death-rate; but it is difficult to imagine anything that could make more difference to the health and happiness of the people than the change from the one to the other. Statisticians may talk coldly of a high rate of infant mortality being "compensated for" by a high birth-rate. The same idea expressed in terms of human misery; of so many dead babies and an equal number of mothers suffering in vain would be intolerably tragic.

Why, then, is it that the phenomenon of a falling birth-rate in Europe has not been generally welcomed? If it came to a choice between a rational limitation of births, on the one hand, and a degradation of the standard of life, on the other, could there be any doubt that the former would be infinitely preferable? In a world where human beings were all alike the answer would be plain; but statesmen will not rejoice in a declining birth-rate among their own people, if menacing neighbours continue to multiply; and, within each community, men are not pleased to see the class to which they belong being crowded out of existence by another. The complications introduced by racial, national and class distinctions have been left out of account in the foregoing argument. They must be considered in the next two chapters.

CHAPTER VII

INTERNATIONAL POPULATION PROBLEMS

"Why do the nations so furiously rage together; and why do the people imagine a vain thing?"

Psalm ii. 1.

§ 1. *The Influence of Nationality.* People nowadays are obsessed with national and racial differences. The growth of nationalities during the nineteenth century was partly a unifying process, by which artificial barriers were removed between people of like traditions and interests, the area of centralized government enlarged, and internal peace, free trade and unrestricted communication secured to great aggregations of human beings, like the inhabitants of Germany and Italy. For the rest, the nationalist movement was concerned with the right of communities which felt themselves to be separated from their neighbours in vital matters, to govern themselves in their own way and to be freed from the interference and domination of alien states. The tragedy of recent history is the transformation of the spirit of nationalism from one which seeks unity and resists oppression into a jealous exaggeration of differences and a desire to oppress others. The idealists who looked forward to the break-up of the

Austrian Empire as the greatest blessing which could come to Europe, have seen the Succession States using their freedom to impoverish themselves and their neighbours by every device which could impede trade or foster bitterness.

Contempt for this grotesque parody of national feeling must not, however, blind us to the fact that there are racial and national differences of a very real kind. "It takes all sorts to make a world," as country-folk say in excusing eccentricities, and the world would be a poorer and duller place were it not for the diversity of human types each capable of contributing some characteristic art or industry or wisdom to the common stock. If we ever learn to live together in peace and mutual forbearance, settling collectively the problems which affect us all and refraining from interference with one another in the things which concern us only within our national groups, we shall realize the value of that variety. Meanwhile the problems of population are multiplied by the number of the nations and increase in geometrical progression with the jealousies and hostilities between them.

§ 2. *Japan and India.* There is the problem of the East and the West. How are the necessities and prejudices of Western civilization to be reconciled with the venerable traditions of Asia? This is largely a population problem and one of the toughest. For even now the people of Japan are seeking an outlet for their surplus offspring and finding the coasts of North America and Australia barred against them by Western armaments. Can we tell them that they must limit their

numbers while Europe continues to increase and spread its children over the whole earth ? That is the attitude which is tacitly adopted by America and Britain at present; but it is not easily to be reconciled with international justice. Moreover, the claims of the ancient East are now put forward by Japan in a language which Europe understands, the language of modern armaments. What if the teeming population of China were equipped with the latest weapons of destruction ?

It is impossible in this handbook to discuss these immense questions of world politics or to do more than indicate their existence. The "White Australia" policy, by which a population considerably smaller than that of London claims a whole continent and excludes Asiatics not only from the districts now inhabited, but also from the tropical North where European settlement has not yet been successful, is a typical, if extreme, instance of the attitude which the white man has adopted. The implication is that the Asiatic is not only different from, but inferior to the European. Whether this can be justified scientifically is at least doubtful. To reconcile it with a future of peace and disarmament is impossible.

Another population problem which arises out of the contact between East and West is that of over-population in India. British rule has done much to improve the conditions of life in India, but it has also cut away the checks to population which formerly prevailed there. Apart from the checks of almost continuous warfare and destructive famines, the peoples of India used to restrict their numbers by various religious and social

customs akin to those which are found among primitive peoples. These customs were abhorrent to European minds and have been almost entirely stamped out, with the result that the population has increased alarmingly. India suffers from the dual evil of a high birth-rate and a high death-rate. The average rates per 1000 living for the period 1896–1905 were: birth-rate 38·58; death-rate 34·2; while in England the birth-rate was 26·8 and the death-rate 15·15. Out of every 1000 children born in India 250 die before they are a year old; in the United Provinces of Agra and Oudh the rate of infant mortality is 352 per 1000; in England and Wales it is 127·3.

Mr. P. K. Wattal, of the Indian Finance Department, in an able pamphlet,[1] sums up the evils from which India is suffering, as follows:

"As compared with European countries we have:

(*a*) A smaller natural increase in spite of a higher birth-rate.

(*b*) A smaller fecundity in spite of a larger percentage of married persons.

(*c*) An infantile mortality twice or thrice or even four times as high.

(*d*) A much smaller average expectation of life with a steady downward tendency.

(*e*) A higher death-rate among young mothers; and lastly,

(*f*) In common with European countries the tendency to increase is greater among the lower classes than among the higher."

[1] *The Population Problem in India, 1916.*

Mr. Wattal does not ask that India's former checks to population should be restored, but that the check which Europe has partially adopted, the voluntary limitation of families, should be popularized in India also.

§ 3. *The Big Four.* The importance of mere numbers in world politics is very great. Everyone will remember when the Allies assembled at Versailles in 1919 to arrange the terms of the Peace Treaties how rapidly they were reduced for business purposes from a conference of thirty-two nations to a Council of Ten and from a Council of Ten to a Council of Four—the Big Four. No less significant was the way in which the Genoa Conference, at which Russia and Germany met the other European states for the first time after the war on terms of equality, resolved itself into a debate between the big countries only. Even the League of Nations, in which all the nations have an equal status, conducts most of its business in a Council composed of the Big Four and four others. The Big Four at Versailles were America, Britain, France and Italy; at Genoa, they were Russia, Germany, France and Britain; and on the Council of the League of Nations they are the British Empire, France, Italy and Japan. Thus there are seven Great Powers to reckon with in the world to-day. Let us briefly examine the position of some of them.

§ 4. *The United States.* The population of the United States in 1820 was about nine and a half millions, in 1920 it was 105,710,620. Between 1910 and 1920 the population increased by 13,738,354. This, as we saw in the last chapter, represented a substantial falling

off in the rate of growth; but it is absolutely a huge increase. If numbers continue to multiply at this diminished rate, the population will double in about eighty years. The significance of these figures is increased by the fact that American supplies of food and raw materials have enabled the population of Europe also to expand greatly during the past hundred years, so that altogether the growth of numbers due to American development is gigantic. The United States, however, unlike most European countries, can be entirely self-supporting. Within her vast territories she possesses almost every variety of climate and natural resources. She has developed within her own borders the manufacturing industries which in earlier times she stimulated in Europe. The bare existence of this great swarm of active beings across the Atlantic must influence the political psychology of Europe, but it is not altogether inevitable that America should take a large direct part in the industry or the politics of the Old World during the next hundred years. If Europe disappeared, America could still live on.

§ 5. *The British Empire.* The remarkable character of the British Empire is revealed by a few population figures. In 1821 there were 14,000,000 in Great Britain and 6,800,000 in Ireland. In 1921 there were 42,800,000 in Great Britain, 4,500,000 in Ireland, 5,500,000 in Australia, 1,200,000 in New Zealand, 319,000,000 in India, 1,500,000 Europeans in South Africa and eight or nine millions in Canada.[1] The position in

[1] There were 7,200,000 in Canada in 1911; the 1921 figures are not yet available.

Great Britain has been discussed in the preceding chapters; the size of her population is disquieting to those who realize how unstable is the foundation upon which her welfare has been built, but it will be seen from these figures that there is still room in the Dominions for a great expansion of population. It is probable that in time Canada and Australia will be able to support between them something like two hundred millions of people. How far this growth may be expected to relieve the situation in Great Britain will be considered later.

A curious sidelight on the influence which population changes may have on political issues is cast by the above figures respecting Great Britain and Ireland. In 1821 the Irish people were half as numerous as the people of Great Britain. At that time, therefore, and for many years after, an independent and hostile Ireland would have been a frightful menace to this country. This may partly account for the tradition that the very existence of Britain depended upon the subjection of Ireland, which survived long after the circumstances had undergone a radical change; until, at last, in 1921, when the British outnumbered the Irish by ten to one, complete self-government was conceded to them and an apathetic British public wondered vaguely why the concession had been so long withheld!

§ 6. *France.* France had a population of 29,000,000 in 1815, at the close of the Napoleonic Wars; in 1870, before the cession of Alsace-Lorraine to Germany, she had 38,400,000; in 1913, 39,700,000; and in 1921,

when the restoration of Alsace-Lorraine is set off against the fearful losses of the war, 39,200,000 inhabitants. The causes of a stationary population in France were briefly discussed in the last chapter. Its effect on the general social welfare of that country does not seem to be bad. M. Levasseur, who has studied the problem very thoroughly, implies in his book, *La Population Françaisc*, that, while the political and military effects of a low birth-rate may be serious, there are compensating advantages in its influence on material comfort and social progress. Unfortunately, the reaction of France from seeing her neighbours growing rapidly in numbers while her own population remains unchanged, appears to be far from pacific. A nervous consciousness that the biggest battalions must henceforth belong to other nations makes French statesmen pursue an external policy designed rather to weaken potential enemies than to win the confidence of allies. By the year 1914 the population of Germany was nearly 70 per cent in excess of that of France, and it seems, at the time of writing, as though French policy aimed at retarding the economic recovery of the German people in order to counterbalance the military advantage which their greater numbers imply.

It is perhaps unfortunate from an international point of view that France is not dependent upon foreign trade for the essential means of existence. Her geographical position precludes her from the measure of isolation which is possible to the United States, but the weakness and poverty of her neighbours does not react upon her own welfare so directly and acutely as it would if she, like Great Britain, were obliged to

exchange her manufactures for food and raw materials from other countries in order to live at all.

It is curious that French anxiety respecting the problem of population has been until quite recently so completely concentrated upon the birth-rate, to the neglect of the death-rate. The birth-rate in France between 1900 and 1909 stood at 20·25, the death-rate at 17·32; while in England and Wales, with a birth-rate of 26·8, the death-rate was only 15·15; in New Zealand, with a birth-rate of 26·79, the death-rate was 9·76; and in Sweden, with a birth-rate of 26·17, the death-rate was 14·68. It is obvious that if the French could secure a death-rate as low as that of Sweden there would be a considerable natural increase in their numbers. It is an important fact, however, that a declining birth-rate means that the proportion of old to young increases and that therefore a higher death-rate is inevitable. Let us then look at the rate of infant mortality which cannot be affected by the age-composition of the community. In France the deaths of children under one year, per 1000 births, in the period 1902 to 1911, averaged 132·4; in England and Wales 127·3; in New Zealand 64·3; in Sweden 84·4. Here, surely, is a source of population which France should exploit, before resorting to desperate measures to bring more children into the world! It is satisfactory to learn that vigorous measures are now being taken for the protection of both mothers and babies in France.

§ 7. *Germany.* The population in 1815 of the various states and principalities which are now Germany was

twenty-one millions ; in 1880 it was forty-five millions ; in 1913 it was sixty-seven millions. In the last few years before the war the population was increasing annually by about 850,000, and emigration had practically ceased. From a self-supporting agricultural country, Germany had become, in a comparatively few years, a highly developed industrial country, importing, in 1913, twelve million tons of foodstuffs, or about 15 per cent of her total consumption. The output of German coal grew from 30,000,000 tons in 1871 to 190,000,000 tons in 1913, and the industrial development of the country corresponded, as Jevons would have expected, with this increase. Thirty-nine per cent of Germany's exports in 1913 consisted of iron goods, machinery, coal, woollen goods and cotton goods. Thirty-five per cent of her imports were raw materials and 28 per cent food-stuffs. Germany before the war was the very heart of the European industrial system. The circulation of trade and credit to and from this active centre was the life-blood of all the neighbouring peoples. More goods flowed into Russia, Norway, Sweden, Denmark, Holland, Switzerland, Italy, Austria-Hungary, Roumania and Bulgaria from Germany than from any other country, and she was the second largest source of supply to Great Britain, Belgium and France. More goods flowed into Germany than into any other country from Russia, Norway, Holland, Belgium, Switzerland, Italy and Austria-Hungary, and she was the second best customer of Great Britain, Sweden and Denmark. To the countries lying east and south of her frontiers, Germany gave not only trade, but capital and organization for their development, and they were

thus to a great extent dependent upon her for the means of maintaining life itself. The population of Germany and Austria-Hungary together was about equal to that of North America ; and the whole of this great economic system could only be supported by a constantly increasing activity at the centre. "The German machine," it has been well said, "was like a top which to maintain its equilibrium must spin ever faster and faster."[1]

§ 8. *Russia.* Russia in Europe increased her population in the interval between the two great wars almost as rapidly as the United States—from forty-eight millions in 1815 to about one hundred and fifty millions in 1914. The birth-rate in European Russia for the period 1902–11 was stated to be 48·47 ; the death-rate, 31·41 ; and the rate of infant mortality from 1895–1904 was about 260 per 1000 births.

As long ago as 1882 Sir Robert Giffen, the most sagacious of statisticians, called attention to the difficulties which threatened Russia through her enormous rate of increase.

"Until lately," he said, "Russia has been largely in the condition of a new country, with vast quantities of land over which a growing agricultural population could spread. Now the European area is more or less filled up, and unless the vast territory of Siberia can be largely utilized for settlement, which appears doubtful, the pressure of population on the means of subsistence in Russia may soon become very great. The soil may be capable of supporting with better agriculture a larger population : but this is not the point. The kind of agriculture possible in any country is

[1] J. M. Keynes, *The Economic Consequences of the Peace*, p. 11.

related to the existing capacity of the population, or to such improvements in that capacity as are in progress, and with the Russian population as it is, there are certainly traces in Russia of an increasing severity in the struggle for existence, which may at any moment become most serious."[1]

We know now how well-founded these forebodings were. The war disturbed the precarious equipoise of Russian life. Revolution and famine were lying in wait for an opportunity to seize their gigantic prey. Without the armour of social stability or the strength of economic reserves, Russia was soon swallowed up by these two monsters; and the country, which before the war supplied a quarter of the world's exportable wheat surplus, is now begging for bread to save her children from dying in millions of sheer starvation.

§ 9. *War and Population.* These, then, are the principal characters in the great world drama. Let us now turn to the drama itself and consider what part in it is played by the Malthusian principle of population; how far the struggle for supremacy among the nations is indeed a struggle for bread forced upon them by the pressure of population on the means of subsistence, and how far war may truly be regarded as a check to population, and therefore as a dreadful remedy for the excessive growth of numbers.

Sir Walter Raleigh, in a passage quoted above (in Chapter I) said :—

"When any country is overlaid by the multitude which live upon it, there is a natural necessity compelling it to

[1] Inaugural Address as President of the Statistical Society, reprinted in *Economic Enquiries and Studies*, Vol. II, pp. 13, 14.

disburden itself and lay the load upon others, by right or wrong, for (to omit the danger of pestilence, often visiting them that live in throngs) there is no misery that urgeth men so violently unto desperate courses and contempt of death as the torments and threats of famine. Wherefore, the war that is grounded on general remediless necessity may be termed the general and remediless or necessary war."

This thought has been expressed many times since the days of Raleigh, in many languages and a great variety of forms. General von Bernhardi, for instance, says:—

"Strong, healthy and flourishing nations increase in numbers. From a given moment they require a continual expansion of their frontiers, they require new territory for the accommodation of their surplus population. Since almost every part of the globe is inhabited, new territory must, as a rule, be obtained at the cost of its possessors—that is to say, by conquest, which thus becomes a law of necessity."[1]

Now, it is fairly obvious that wars of the type suggested in the phraseology of these passages—wars in which a rapidly multiplying people, in imminent danger of starvation, burst through their national boundaries and seized the fertile lands of some neighbouring country—did not occur in the days of Sir Walter Raleigh, and have not occurred on any great scale since his time. History does not recognize, for instance, the Napoleonic Wars or the World War of 1914–18 as "remediless or necessary wars" in the sense in which Sir Walter Raleigh used these words. The French were

[1] *Germany and the Next War*, p. 14.

not forced at the beginning of the nineteenth century to choose between starvation or aggression, nor were the Germans a hundred years later. It would be safe to say that among the considerations which influence the minds of emperors and statesmen when they go to war, population problems have hitherto played an inconspicuous part.

Wars, however, like all the events in which great masses of men are involved, are brought about by many and complex causes, among which conscious motives are often less important than hidden influences lying beneath the surface of things. To reveal these hidden influences is a necessary preliminary step to their control, and it is only by understanding the forces which are at work among us that we can hope to substitute human reason for blind impulse in the governance of the world. In this matter, therefore, as in others that have been touched upon in preceding pages, it is necessary to enquire whether the pressure of population may not have had an indirect influence of which the chief actors in the drama were scarcely conscious.

If provisions are scarce and employment difficult to obtain at home, it is natural that adventurous spirits should go abroad in search of better fortune. That was how the American colonies came into existence; and that is perhaps the main reason why the inhabitants of these small islands have spread themselves over the globe. If there had been ample room for an expanding population in the United Kingdom, it is very probable that the Empire would not have been invented. Then the colonial wars with France would not have taken place; a later generation would have had no reason to

fear the power of Russia; the American and Boer wars would have been impossible, and the whole course of European history would have been different. Thus it may be seen at a glance how closely population questions are involved in the underlying causes of national and racial conflicts. But this, it must be admitted, is little more than saying that if human beings did not come into contact with one another they could not fight! The vital question is whether conflicts actually tend to arise through the competition of nations for the limited subsistence yielded by the earth to human efforts. Here, as we have seen, there are two opposing tendencies at work. On the one hand, there is the tendency for the total amount of human subsistence to be greatly increased by co-operation between man and man, by the division of labour and the application of science to nature. On the other hand, the Law of Diminishing Returns tends to develop a constantly increasing competition between nations for sources of food and raw materials and for markets in which to sell the manufactures which pay for the food. Unfortunately, the latter tendency exercises a greater influence on the conduct of diplomacy than the former. We have only to glance through the list of subjects which occupied statesmen during the ten years before the war—Morocco, Tripoli, the Bagdad Railway, the Congo, Mexico, China—to see that this is true. The scramble for first place in the exploitation of backward races and undeveloped territories, for markets and for sources of raw materials is one of the most potent causes of international friction. Are we not then forced to the conclusion that the fundamental problem of human life—the pressure of

population on the means of subsistence—plays a considerable part in creating the atmosphere in which wars arise? The fact that the real nature of these issues is little recognized, and still less discussed, by diplomats is itself a source of danger. In many cases a solution tolerable to all parties to the dispute could be found: free access to raw materials or markets—the Open Door in Morocco, for instance—would be a small price to pay for co-operation instead of conflict; but the underlying issue is seldom brought to light, and some artificial cause of quarrel, like the despatch of a gunboat to an obscure harbour, proves more dangerous than the tangible interests would be if they were squarely faced. Not, indeed, that there is any way by which the nations can go on multiplying without creating a scarcity in the products of the soil. It is not suggested that an easy solution of the subsistence problem awaits the statesman who is clear-sighted enough to face it. It is a hard nut to crack. But it is not made any easier by war; on the contrary, it is rendered more difficult. If war had been avoided in 1914, the inhabitants of Europe would have been living to-day on a relatively high standard and receiving generous supplies of food and raw materials from every quarter of the globe. It is the war itself which has made the population problem a burning question.

§ 10. *War and Subsistence.* Malthus included war in his list of checks to population. It is natural that he should do so, for it is destructive of human life, both directly and indirectly, through the famine and disease which it brings in its train. As a means of reducing

population *relatively* to the food supply, however, war is a disastrous failure. The Thirty Years' War, as we saw in Chapter I, was immensely destructive of human life ; but at the same time it was destructive of human food and the means of producing food to such an extent that it probably lowered the standard of life of the people who survived. "Bavaria, Franconia and Swabia," we read, "were desolated by famine and disease, while the rest of Germany and Austria fared little better. . . . Cattle and sheep diminished to an extraordinary extent, and many once fertile districts became forests inhabited by wolves and other savage beasts."

One may reasonably doubt whether the proportion of the means of subsistence to population was increased by this process.

In modern war the same difficulty arises. The destruction of human life is accompanied by a greater diminution of the means of subsistence through a dislocation of production and transport, and a deterioration of the soil through neglect ; and, in some cases, the food supply takes longer than the population to recover its former magnitude. Let us look at the grim balance-sheet of the great war by which Europe is still (four years after the armistice) half paralysed. France, the country which, with her stationary population, must be the slowest to recover her numerical strength, lost more than two million people between 1914 and 1921. This figure is exclusive of the inhabitants of the restored provinces of Alsace-Lorraine, but it includes civilian deaths, which were swollen by an increased rate of mortality attributable to war conditions, including the influenza epidemic of 1918. With the return of peace,

the number of marriages and births rapidly increased and the number of deaths decreased. In 1920 there were twice as many marriages as there were in 1913. The excess of births over deaths, excluding those in Alsace-Lorraine, was 143,000 in 1920, and 100,000 in 1921, as against an average from 1904 to 1913 of 33,500. The increase in 1920 has been paralleled only in the years immediately after the Franco-Prussian war. Apart, then, from the restored provinces, it will take France about seventeen years to regain her 1913 population, if the natural increase remains at the level of the last two years; or thirty to forty years if the rate falls to the pre-war level. Alsace-Lorraine contains about 1,700,000, and if these are included the total population of France is already within half a million of its former size.

When one thinks of the shattering experiences through which the German people have passed since July, 1914, the vital statistics of Germany are astounding. About 1,700,000 Germans were killed in the war. The loss due to the reduction of the birth-rate in the war years is estimated at 3,300,000; and the increased mortality among the civilian population at 500,000. The surrendered territory, including Upper Silesia, contained six and a half millions of inhabitants. Yet the total decrease in the population of Germany between 1913 and 1921 was only four and a half millions! In other words, the population of post-war Germany has *increased* since 1913 by two millions! This extraordinary fact is partly accounted for by an influx of refugees—Germans expelled from abroad and others—the number of whom cannot be accurately determined, but is estimated at

about a million. For the rest, a post-war boom in marriages and births and a low mortality (especially infant mortality, which has actually been less since the war than in 1913) must be held responsible.

The population of Russia has, of course, been greatly diminished by the chaos into which that country has been flung since the war began. As, however, it is painfully evident that Russia is suffering more from over-population in 1922 than she was in 1913, it is unnecessary to go into the statistics. The same remark applies in a lesser degree to Austria. In Great Britain, Belgium and Italy the population in 1920 was equal to, or greater than, that of 1913.

Turning now to the other side of our balance-sheet, to the effect of the war on the means of subsistence, what do we find? That everywhere among the belligerents productivity has decreased in a much greater degree than population. In 1919, Mr. Hoover, the American Food Controller and Director-General of Relief in Europe, estimated that the population of Europe was at least one hundred millions greater than could be supported without imports, and warned the world that unless productivity could be rapidly increased there could be nothing but "political, moral and economic chaos, finally interpreting itself in loss of life hitherto undreamed of."[1] Three good harvests and the extraordinary recuperative power of human beings have gone a long way towards falsifying that estimate. Nevertheless, the German people still have to subsist on 55 per cent of the supply of the most necessary articles of diet which was available per head before the

[1] *Times*, August 13, 1919.

war. The standard of living has been lowered 45 per cent. Even so, Germany has now to import 17·7 per cent of the most necessary foodstuffs, as against 5 per cent in 1913. In order to give back to it its pre-war productivity, the soil of Germany must have restored to it the nitrates and phosphates taken from it during the war; but the nitrate factories cannot work without the coal and coke which are sent abroad under the terms of the Peace Treaty, and phosphates cannot be imported in sufficient quantities until purchasing power increases.

It is unnecessary to pursue this enquiry into the effect of the war upon the means of subsistence in Germany, or to describe the position in the other belligerent countries. The poverty and disorganization everywhere are only too conspicuous. There can be no doubt whatever that the loss of population in Europe through the war is far exceeded by the diminution in the means of subsistence, and that there will be many more people than there were in 1913 before the recovery of pre-war productivity has been accomplished. Like the giant in the fairy story, a modern nation grows new heads faster than the avenger can cut them off.

It would seem, then, that modern war is not a check to population in the Malthusian sense at all. An influence which decreases the number of human beings to a smaller extent than it diminishes the yield of human food and the other necessaries of life does not come within that category.

Far from being a remedy for over-population, war is, indeed, one of the most powerful influences tending to keep the standard of life down to the subsistence level. On the one hand, it interrupts the process of world-wide

co-operation in the exploitation of nature, without which the earth could not maintain a tenth of its present population. On the other hand, it creates a special and urgent need for more and more human beings in each nation in order to supply the man-power which makes for victory. In the vicious circle thus created the teaching of Malthus is only too clearly vindicated. The greater the pressure of population upon the world's food supply the more likelihood there is that points of friction will arise between the nations in potential food-producing areas; and the instinctive nationalist re-action to this half-formulated fear, that a redundant population at home will suffer through the competition of other nations for "places in the sun" and new sources of food and raw material, is not to co-operate more fully with those other nations so as to produce the maximum supply of the desired commodities as rapidly as possible, but rather to seek exclusive privileges in undeveloped countries, to claim preferential treatment from colonies, and to erect protective tariff barriers and other obstacles to the free exchange of goods and services throughout the world. In this way the consciousness of having an excessive population tends to make a nation adopt a restrictive trade policy and an aggressive foreign policy, though the former may lower the standard of life in its overcrowded cities, while the latter will lead to a demand for a still greater population to serve the purposes of war.

It is necessary to repeat that the difficulty does not arise exclusively from racial and international hostilities. To suggest that there would be plenty of food and raw materials to maintain all the nations in comfort no

matter how rapidly their numbers increased, if only they would live together in peaceful co-operation, would be as unwarrantable as the easy optimism of anti-Malthusians in the nineteenth century. The population problem can only be solved by a decline in the world's birth-rate, and if that solution is not attained, then the checks which Malthus enumerated will continue from time to time to reduce excessive numbers through the instrumentality of vice and misery.

National hostilities, however, interpose a barrier between mankind and the rational consideration of the matter, and lead to national policies which aggravate the evils and increase the dangers by which the laws of nature have surrounded us. The first step towards the co-ordination of the number of human beings with the available food supply will not be taken until we have ceased to regard a relative advantage over rival nations as more important than the well-being of humanity as a whole.

§ 11. *Emigration.* That the present trend of opinion is away from a world policy in regard to population problems, and tending rather to harden in the direction of exclusive nationalism, is illustrated by the new attitude towards emigration and immigration which has been adopted since the war.

Hitherto, the migration of the surplus population of the Old World to seek a livelihood by developing the resources of new countries has, generally speaking, been regarded as beneficial to all concerned. Besides relieving one labour market and supplying another, the process was held to assist production by transferring

resources from places where their productive power was less to places where it was greater, thus adding to the joint wealth of the old and new countries. That acute distress in Ireland, for instance, was relieved by continuous emigration on a very large scale in proportion to her population is generally accepted; and that the development of the United States has been quickened by streams of immigrants from Europe is undeniable.

A great deal depends upon the age and character of the emigrants. It is clearly impracticable to transfer a representative section of the community to the other side of the world. In practice it must be the young men and women who go abroad, with just a sprinkling of children, and it is difficult enough to avoid a great excess of male over female emigrants. One result of emigration must, therefore, be that the proportion of workers to non-workers (the young and the old) remaining behind will be diminished, and a serious additional burden will be thrown upon the former. A more speculative question is whether the birth-rate among the home population will not rise. During the Middle Ages, when the principal check to population was postponement of marriage, there is reason to believe that any unusual mortality due to war or pestilence was followed by a sharp rise in the birth-rate, so that the population rapidly recovered its former magnitude. Now, postponement of marriage is still to some extent operative as a check to population, and it is at least possible that the emigration of a large number of young adults would thus stimulate the fertility of those who remained behind.

Emigration, in fact, is an appropriate remedy for a temporary surplus of labour in industry such as may so easily arise in the interval before population can adjust itself to a change in conditions. It is not by any means a complete remedy for a recurring annual excess of births over deaths in an overcrowded country.

The clear-cut division of labour between Europe and America, which characterized the growth of wealth and commerce in the 'seventies, made it very obvious that emigration must benefit both continents. The industrial development of Europe was assisted by the growth of new markets for manufactured articles abroad, while the cost of living was kept down by an ever-increasing supply of food and raw materials grown by the emigrants. America, on the other hand, profited by the supply of labourers from Europe, and by the implements, capital goods and transport facilities which accompanied them. It was an ideal arrangement. During the last thirty years, however, American opinion has been hardening against the unrestricted admission of immigrants from Europe. The conditions have changed. America is filling up; and economic objections to the free admission of cheap labour are reinforced by political considerations with regard to the racial composition of the population. Since 1917 a literacy test has been imposed upon immigrants to the United States, with the object of checking the flow of people from Southern and Eastern Europe without interfering unduly with those from Western Europe. This measure, however, was considered altogether inadequate to protect America against the invasion of hordes of refugees

expected after the war; and in 1921 a law was passed enacting that the number of aliens of any nationality who may be admitted into the United States in any fiscal year shall be limited to 3 per cent of the number of foreign-born persons of such nationality resident in the United States, as shown by the census of 1910.

Meanwhile a sudden change has taken place in the attitude of European states towards the emigration of their citizens. The war-time valuation of "man-power" has been applied to the affairs of peace. The value of each individual to the State as a potential soldier, or an economic asset, is now carefully weighed before he is allowed to leave the country, and even when emigration is permitted, the emigrant is still subject to elaborate regulations designed to preserve some part of his economic value for his country of origin. Before the war a few simple international conventions governed the movements of population; for the rest, the countries of destination selected and controlled the immigrants. Now we have rival policies developing between the emigration and immigration countries, and some com promise must be reached if freedom of movement is not to disappear from the earth.

Great Britain is happily relieved from anxiety regarding this new phase of exclusive nationalism by the existence of the Dominions overseas. There is plenty of room within the Empire for British emigrants for many years to come. "Why, then," it is sometimes asked, "should we feel any uneasiness about the continued growth of population at home? We may be exhausting our reserves of coal and losing markets for our manufactures, but is there not plenty of scope for our surplus

labour in the Dominions ?" It is necessary to examine this suggestion in some detail.

The reader may remember that early in this chapter it was suggested that Australia and Canada together would eventually be able to support some two hundred millions, and an undertaking was given to examine later how far this room for expansion might be expected to relieve the situation in Great Britain. This, then, is the place in which to carry out that enquiry.

During the last ten years the population of England and Wales, if there had been no deaths due to war, would have increased by about 2,500,000. The emigration during the same period has been about 630,000, the highest figure in any decade since 1871. In order to keep the population of this country constant, therefore, an emigration of about 250,000 persons each year, or five times the present rate, would be necessary. Let us assume that, with the aid of the British and Dominion Governments, this number could be carried overseas and given employment in Canada and Australia. What would be the effect on conditions in England ?

It is impossible to foresee whether this emigration would increase or decrease the birth-rate in the old country. At first sight it would seem probable that the withdrawal of a number of men and women at an age for parenthood would diminish the average fertility; but we have seen how the birth-rate in all countries rises after a war, and it must be remembered that emigration is proposed as a means of benefiting the home population. *Ex hypothesi*, therefore, the immediate effect should be to improve the conditions of labour, to offer, if not better wages, at least more

continuous employment to those who remain. What guarantee is there that they would not take out this improvement in earlier marriage and a higher birth-rate?

The indirect effect upon the home population of a great increase in the number of people in Canada and Australia is also difficult to determine. The world is now an economic unit. An increase in the supply of capital and labour in a far country must, therefore, have a great influence on the welfare of the people here. We have seen already how the industrial development of the United States has reacted upon the life of Europe.

Now if our emigrants had remained at home a large proportion of them would necessarily have been employed in manufacturing industries. Must we assume that they will be so employed in the Dominions? The effect of their labour upon conditions in England depends very largely upon the answer to that question. If they increase the supply of food and raw materials in Australia and Canada they will benefit England by promoting the exchange of those things which she needs for the manufactures she produces. If, on the other hand, they develop the manufacturing industries of the New World, it might have been better for their countrymen if they had stayed at home. Those who are not themselves engaged in manufacturing must, indeed, derive some benefit from the opening-up of a new source of supply which in the long run will help to cheapen the articles produced. From the point of view of England as a whole, however, this advantage is to some extent counterbalanced by the dependence

of a large part of the community upon the production of articles which would have to meet intensified competition in the markets of the world and especially in the Dominions themselves. Our 250,000 workers would overstock the labour market in this country, but, at the best, some advantage might be obtained from increasing returns in industry if they remained here, and, at the worst, they would share with their fellow-workers the evils of over-population. If they emigrated and enlisted in the same industries overseas, their competition would be just as keenly felt at home, it could not bring with it any compensating economies in production, and it might be more severe because it would be based upon the untapped resources of new lands.

The evidence as to whether the emigrants would, in fact, tend to go on the land or into industry is conflicting. On the one hand, the Dominion Governments prefer to put new-comers into farming; the trade unions in the Dominions do not welcome a great accession to their numbers; and the type of man who has hitherto left Great Britain to seek his fortune in the New World takes kindly to an open-air life. On the other hand, manufacturing industries being fostered by protection in Australia and Canada, the farmer is discouraged by taxation for their benefit; and a great increase in emigration, such as we are considering, could not be confined to the type of man who ordinarily chooses to rough it abroad, but must include a large proportion of industrial workers, for whom, indeed, it is designed. There can be no certainty as to what would happen; but one may hazard a guess that, even if all

the emigrants were in the first place planted upon the land, a very large proportion of them would eventually drift into the towns.

It would seem, then, on examination, that emigration is by no means a perfect remedy for over-population. It involves the withdrawal of a number of people from the community at a time of life when they are most active, leaving the young and the old to be provided for by others. It throws upon a country which is already feeling the strain of population the burden of breeding up human beings to the productive age and then exporting them free of charge. It may give rise to an increasing birth-rate at home. And it may stimulate industries overseas in competition with the home country and thus increase the very evil which it is designed to cure.

§ 12. *The Danger to Civilization.* In this brief survey of international population problems we have seen how human co-operation and the division of labour have made it possible for vast numbers of people to come into existence, and to be maintained at a higher standard of life than the earth has ever yielded before. We have also seen how national antagonisms intensify the difficulties which man must overcome in winning his subsistence from the earth. The present tendency appears to be away from co-operation and towards a keener sense of national differences. But that road leads inevitably to a bitter struggle upon an over-populated planet for the bare necessities of life. Is that to be the end of modern civilization, or will human reason overcome blind impulse in time to avert the

catastrophe? That the twentieth century should be faced by this question is a striking proof of the wisdom of Malthus in grasping the issue one hundred and twenty years ago. Let us avoid the shallow optimism of his opponents, for which, indeed, we have less excuse than they had, and face the problem squarely.

CHAPTER VIII

THE QUALITY OF POPULATION

"A good tree cannot bring forth evil fruit; neither can a corrupt tree bring forth good fruit."

Matthew vii. 18.

§ 1. *Introductory.* The first six chapters of this handbook were devoted to the *quantitative* problems of population; the influence of increasing numbers of human beings on the supply of human food—and, in those chapters, the differences between one human being and another were almost entirely ignored. In the last chapter an attempt was made to outline the broadest of *qualitative* population problems; to indicate the complications that arise through differences in race and nationality. Now it is necessary to refer to questions of quality within each community and to consider the bearing of the relative numbers of one sex to the other, and of one social class to another, upon population problems as a whole.

§ 2. *Why there are more Women than Men.* Before the war there were nearly eight million more females than males in Europe, and about 1,300,000 more females than males in Great Britain. In 1921 the females exceeded the males in this country by about 1,900,000, and it is

probable that the disproportion in Europe as a whole has increased in a like ratio. The first fact to notice in seeking the cause of this disparity is that in all Western communities more boys than girls are born ; the excess of male births ranging from twenty to sixty per thousand. The mortality amongst boys, especially in the first year of life, is greater than that of girls, and the numbers become equal in most countries between the ages of fifteen and twenty. Then it appears that the dangers to which men are specially subject in middle age, industrial accidents, war and exposure to weather, are more deadly than those encountered by women, of which the chief is childbirth, and the women begin to predominate in those years. In old age "the weaker sex" displays more vitality than the other, and increases its lead. Emigration, too, must play a considerable part in the disparity between the sexes in Europe, for on the American continent as a whole the balance is tilted the other way, the men exceeding the women by over four millions, while in Australia also there is a shortage of women.

It is generally agreed that the reaction upon social life of this disproportion between the sexes on both sides of the Atlantic is undesirable ; especially so perhaps in Europe, where the status of women is adversely affected by the existence of a "surplus." The most obvious remedy is the promotion of a larger emigration of women from the Old World to the New. An attempt is being made in this direction ; but the difficulties are formidable, since the larger towns in America and the British Dominions already have a fair proportion of women, and the less developed districts are not so

suitable for women to live in. Moreover, the excess of women in Europe is at least double the excess of men in the other countries with white communities, so emigration could at best only solve half the problem. The root of the trouble lies in the high rate of mortality among boy-babies, and it is a disquieting fact that in this country the difference between the sexes in this respect has increased. According to Dr. Saleeby, 14 per cent more boys than girls now die in infancy, and twenty or thirty years ago the difference used to be only 6 per cent.[1] No explanation of this fact has been offered by the authorities on the subject. We have seen, however, that infant mortality as a whole is declining, and as boys are more difficult to rear than girls, it is not perhaps surprising that the latter should be the first to benefit from improved conditions of life. It is to be hoped that as the care of infants further develops, the boys, too, will be saved. It seems probable also that as women are tending more and more to participate in the occupations that were formerly kept exclusively for men, the risks of middle age will fall more evenly upon the sexes and thus the disparity will be reduced.

§ 3. *The Fertility of Different Classes.* The reader may remember that in discussing the causes of the decline of the birth-rate we noted, incidentally, in Chapter VI, that this decline has not been uniformly distributed over all sections of the community, but has been more marked in the more prosperous classes. We must now

[1] Evidence before the National Birth-rate Commission. (*The Declining Birth-rate*, p. 414.)

consider that lack of uniformity in some detail, for it has an important bearing upon the question of the quality of our population.

The births in England and Wales in 1911, per 1000 married men under fifty-five years of age, classified according to the occupation of the father, were as follows :

1. Upper and Middle Class . .	119
2. Intermediate	132
3. Skilled Workmen	153
4. Intermediate	158
5. Unskilled Workmen . . .	213

The rate of infant mortality in these groups, following the same order, was 76·4, 106·4, 112·7, 121·5, 152·5. The proportion of infants born and surviving the first year of life in the different classes was therefore: Class 1, 110 ; Class 2, 118 ; Class 3, 136 ; Class 4, 139 ; Class 5, 181.

From these figures it is evident that the children born at the present time in this country are unevenly distributed among the classes ; the wealthiest people having as a rule the fewest children, and the size of families increasing, broadly speaking, as the incomes decrease, so that unskilled labourers have the most children. It is evident also that infant mortality tends to reduce this disparity, but does not eliminate it. There is no evidence available as to the relative size of families later in life.

Now the figures given above do not show whether the differences in the fertility of various classes have been increased by the fall in the birth-rate ; they only

show that there are differences at the present time. Mr. Udney Yule, however, has compiled a Table in which he has arranged certain London districts in the order of the number of female domestic servants employed, taking this as a measure of the social standing of a district, so that the fertilities of upper and lower-class districts can be compared. The results obtained by this method of comparison are interesting. In 1871 the differences between the districts were by no means regular or striking. The fertilities of Hampstead, Kensington and Paddington, for example, exceeded those of Southwark and Shoreditch, although the former are at the top of the social scale and the latter at the bottom. In 1901 the position was very different. The districts at the top of the list then showed a very low fertility, 23 per cent below that of 1871, while those at the bottom remained as prolific as they had been thirty years before. From 1901 to 1911, however, the top districts decreased their fertility by an average of 3 per cent, while the bottom districts dropped theirs by about 5 per cent. The figures for individual districts are so irregular that Mr. Yule does not lay stress on the last result. "It seems probable enough," he says, "that the more rapid decrease may have spread from the upper strata downwards, and in the decade 1901–1911 have begun to affect even such districts as Poplar, Bermondsey and Bethnal Green, but more evidence is necessary before this can be accepted as a demonstrated conclusion."[1]

The general deduction, that the difference between the fertility of different classes is very much greater

[1] *The Fall of the Birth-rate*, p. 27

now than it was fifty years ago is confirmed by independent statistical enquiries undertaken by Drs. Heron and Stevenson and others, and may be taken as an established fact.

§ 4. *A Cause of the High Birth-rate among the Poor.* It is difficult to regard this distribution of children as satisfactory. Bernard Shaw's dictum on the distribution of wealth: "Dinners without appetites at one end of the town, and appetites without dinners at the other end," becomes still more disquieting when we add: "Houses and comfort without children at one end of the town, and children without houses and comfort at the other end." Clearly birth control has begun to exercise an influence on numbers at the wrong end of the social scale. Probably this was inevitable; certainly it was to be expected, if account be taken of the conspiracy, in which practically the whole of the educated classes have joined until recently, to keep working men and women in ignorance both of their duty not to bring children into the world unless they have a reasonable expectation of being able to provide for them, and of the means by which this duty can be fulfilled.

John Stuart Mill, usually the calmest of philosophers, was moved to write indignantly on this subject, and much of his rebuke is, unhappily, applicable to the present generation.

"Poverty," he wrote, "like most social evils, exists because men follow their brute instincts without due consideration. But society is possible, precisely because man is not necessarily a brute. Civilization in every one of its

aspects is a struggle against the animal instincts. Over some, even of the strongest of them, it has shown itself capable of acquiring abundant control. . . . If it has not brought the instinct of population under as much restraint as is needful, we must remember that it has never seriously tried. What efforts it has made have mostly been in the contrary direction. Religion, morality and statesmanship have vied with one another in incitements to marriage, and to the multiplication of the species, so it be but in wedlock. Religion has not even yet discontinued its encouragements. . . . The rich, provided the consequences do not touch themselves, think it impugns the wisdom of Providence to suppose that misery can result from the operation of a natural propensity: the poor think that 'God never sends mouths but He sends meat.' No one would guess from the language of either that man had any voice or choice in the matter."[1]

To this outburst, Mill added a fierce footnote:

"Little improvement can be expected in morality until the producing of large families is regarded with the same feelings as drunkenness or any other physical excess. But while the aristocracy and clergy are foremost to set the example of this kind of incontinence, what can be expected from the poor?"[2]

§ 5. *Eugenic Considerations.* It must be admitted that the aristocracy now set a different example, and even the clergy (of the Church of England at any rate), contrary to the popular impression, have only seventy-two children for every hundred that are born in average families. Precept, however, has not as yet followed example to any great extent, and much of Mill's indictment is still relevant. Some authorities think,

[1] *Political Economy*, Book II, Chap. XIII, § 1.
[2] *Ibid.* (Note.)

indeed, that our present state is worse than that of which Mill complained, because, they say, we are breeding fastest from the worse stocks, and the physical and mental deterioration of the race must inevitably result. Thus, Dean Inge, who manages to combine the keenest enjoyment of controversy with pessimistic views on the future prospects of mankind, says that:

"Natural selection, which in uncivilized societies weeds out all nature's failures, has almost ceased to act. A dwarf can mind a machine, a cripple can keep accounts. The general handiness and adaptibility which is second nature to a savage is useless in an age of specialization. . . . We are thus faced with a progressive deterioration of our stock, due to the suspension of natural selection and the entire absence of anything like rational selection."[1]

In another place the Dean writes:

"Either rational selection must take the place of the natural selection which the modern State will not allow to act, or we shall deteriorate as surely as a miscellaneous crowd of dogs which was allowed to rear puppies from promiscuous matings."[2]

It is easy to pick holes in the Dean's arguments; to point out, for instance, that even in uncivilized societies dwarfs may be successful witch-doctors, and thus survive and become powerful; that the natural selection which prefers muscles to brains and low cunning to artistic genius is not necessarily desirable, and that many dog-lovers consider mongrels to be more intelligent, hardy and lively than pedigree animals. The advocate of eugenics cannot, however, be dismissed with a few debating points. The purely economic

[1] *Outspoken Essays*, 2nd series, pp. 265–266. [2] *Ibid.*, p. 257.

objection to the present distribution of children can be met to some extent by the provision of free education, by housing acts, by the feeding and medical supervision of children at school, by infant welfare centres, and so on. But if it is true that these measures tend to perpetuate the predominance of the worst stocks in the production of future generations, then they are positively harmful instead of being beneficial. The matter is, therefore, one of serious practical importance.

Is there really any reason to suppose that the poor are physically and mentally inferior to the rich, or even that unskilled labourers are fundamentally inferior, as a class, to artisans? Those who know the poor best are often ready to maintain the contrary view, and to assert that only a superiority over the other classes in stamina and courage could enable them to face the risks and hardships of their way of life. Thus, Stephen Reynolds, who lived for some years in the house of a Devonshire fisherman, wrote that:

"the more intimately one lives among the poor the more one admires their amazing talent for happiness in spite of privation, and their magnificent courage in the face of uncertainty; and the more also one sees that these qualities have been called into being, or kept alive, by uncertainty and thriftlessness. . . . The man matters more than his circumstances. The poor man's *Courage to Live* is his most valuable distinctive quality. Most of his finest virtues spring therefrom. . . . The poor and the middle class are different in kind as well as in degree. (More different perhaps than the poor and the aristocrat.) Their civilizations are not two stages of the same civilization, but two civilizations, two traditions, which have grown up concurrently, though not of course without considerable intermingling. . . . The civilization of the poor may be

more backward materially, but it contains the nucleus of a finer civilization than that of the middle class."[1]

The eugenist, while not necessarily questioning the accuracy of Mr. Reynolds's conclusions with regard to Devonshire fishermen, would say that they are inapplicable to the poor in large towns and industrial districts. It is noteworthy, however, that Miss M. Loane, after long observation of the poor of London, among whom she worked as a nurse, arrived independently at much the same opinion.[2]

Even those who entirely accept the view that the peasant class is likely to be at least as sound from the racial standpoint as any other class, must, however, admit that there are disquieting influences at work. If the classes remained in watertight compartments, and the children were evenly distributed within each class, all might be well for the future of the race. Unfortunately, from the eugenic point of view, there is a tendency for the failures of one class to fall into the next; a converse tendency for the most capable members of each class to climb up the social ladder; and, worst of all, a tendency for the least satisfactory members of each class to have the largest number of children.

The most serious instance of the tendency last mentioned is to be found in the reproductive power of the feeble-minded. It appears to be an established fact that feeble-mindedness is a hereditary defect. It follows the same rules as other hereditary qualities in plants and animals which have been discovered through the science

[1] *A Poor Man's House*, pp. 262, 267, 270.

[2] See *From their Point of View, The Next Street but One*, and other books by M. Loane.

of genetics. Feeble-mindedness is a so-called recessive characteristic and reproduces itself in accordance with certain clearly defined rules, through the marriage of two persons who both come from defective stock. It cannot be bred out of a family in which it has established itself, but it could be eliminated by the segregation of all feeble-minded persons. Unfortunately, the birth-rate of the feeble-minded is 50 per cent higher than that of normal people; and as these poor creatures have, in most cases, to be maintained by the State, it seems most reasonable for the Eugenics Education Society to recommend their compulsory segregation. That measure is, indeed, called for as a protection for the feeble-minded themselves, apart from the interests of the community in which they live.

§ 6. *Present Limitations of Eugenics.* Responsible students of genetics do not, as a rule, advocate any immediate action by the community beyond that indicated in the last paragraph. Their science is still in its infancy, and there are formidable difficulties to overcome before positive action can be contemplated. As an American poet has said :—

> "Only the chemist can tell, and not always the chemist,
> What will result from compounding
> Fluids or solids.
> And who can tell
> How men and women will interact
> On each other, or what children will result?
> There were Benjamin Pantier and his wife,
> Good in themselves, but evil towards each other;
> He oxygen, she hydrogen,
> Their son, a devastating fire."[1]

[1] *Spoon River Anthology*, by Edgar Lee Masters, p. 16.

Even if we knew how to produce children with certain characteristics, we are not yet agreed, as even Dean Inge admits, as to what we should breed for. "The two ideals," he says, "that of the perfect man and that of the perfectly organized State, would lead to very different principles of selection. Do we want a nation of beautiful and moderately efficient Greek gods, or do we want human mastiffs for policemen, human greyhounds for postmen, and so on ?"[1]

Many of us would answer that we do not want either the one or the other ; we would much rather have the present varieties of human beings !

§ 7. *The Relative Importance of Heredity and Environment.* When we turn from ultimate ideals to the practical issues of the day, we find a real and important conflict of opinion between those who lay stress on the influence of heredity and those who concentrate on that of environment. Measures of social amelioration, such as those enumerated above, are generally viewed with grave suspicion by the former as being calculated to encourage the reproduction of inferior types at the expense of their superiors. The latter, on the other hand, frequently urge the adoption of still more drastic means for improving the conditions under which the majority of children are born and reared. The endowment of motherhood, and the enactment of a national minimum wage, are characteristic projects of this school of thought. There is much, of course, to be said on both sides in this controversy. The eugenists have not yet succeeded in proving that there is any close correlation

[1] *Outspoken Essays*, 2nd series, p. 175.

between wealth and quality, though their case against social reform depends mainly upon the assumption that such a correlation exists. In emphasizing the part played by heredity they seem to forget that the bluest blood may be poisoned by the diseases bred in slums, and that the noblest intellect may be obscured by misuse in early life. Gray's familiar lines—

> "Some village Hampden that with dauntless breast
> The little tyrant of his fields withstood,
> Some mute inglorious Milton here may rest,
> Some Cromwell, guiltless of his country's blood."

may still contain a lesson of some importance for the world. The measures designed to give equality of opportunity to the children of all classes may not only satisfy the sense of justice, but also enrich the world by opening up great reservoirs of hidden talent. Moreover, they may raise the average standard of efficiency in the ordinary business of life—an object of first-rate importance in view of the increasing difficulty in maintaining Western standards of civilization.

§ 8. *The Relation between Quantity and Quality of Population.* The socialist, however, is apt to ignore altogether the reaction which his policy may have upon the growth of population. In placing upon the community the whole burden of supporting and educating the children of the poor he does not, as a rule, stipulate that the community should have any voice as to the number of children to be brought into existence. It is true that an improvement in material circumstances has in recent years been accompanied by a lower birth-rate in the class affected, but this has probably been due

mainly to prudential considerations depending upon the precarious nature of the advance in comfort which has been secured. There is no reason to suppose that a national minimum standard of life provided by the community, irrespective of the efforts of individuals, would have the same result. It is true that decent civilized people cannot let their neighbours starve to death while they themselves have any surplus over the bare necessities of life ; but to admit the strength and excellence of that humanitarian instinct is a very different thing from saying, as many people say nowadays, that every human being has a *right* to a certain standard of life and comfort. That is a claim that could not be admitted, without courting disaster, by any community which did not at the same time take upon itself the difficult task of regulating the birth-rate. The arguments used by Malthus to refute the dreams of Godwin and Condorcet as to the perfectibility of man and the prospect of banishing poverty and misery from the life of humanity, are valid to-day in answer to the extreme socialist. Until there is some guarantee that population will not increase up to the means of subsistence there can be no security for a national standard of life. Until some more effective means of restricting the birth-rate is discovered it is necessary to insist upon the responsibility of a parent for the support of his child.

Economic considerations, based mainly on the quantitative aspect of the problem of population, point, then, to an attitude midway between those adopted by the eugenist and the socialist. Even if it were clearly established that the children of unskilled labourers were

the best that could be born, it would still be desirable, for the urgent economic reasons discussed in the foregoing chapters, that the birth-rate among unskilled labourers should be reduced. Most economists would probably agree, therefore, with the advocates of eugenics in seeking to increase the practice of birth-control among that class. Apart from direct propaganda, however, the most effective means towards that end appear to be a rise in the standard of life, improved social conditions and better housing accommodation, as long as these benefits are not obtained at the expense of parental responsibility. Here the economist will find himself in accord with the socialist, up to a certain point, though he may soon part company with him again as to the measure of social amelioration which is practicable in this hard world. The economist is bound to recognize that the wants of mankind are manifold while the means of satisfying those wants are severely limited. That is a fact which is disguised by inequalities in the distribution of wealth. Some few people have such an impressive display of goods and such a large claim upon the labour of others that it is difficult to believe that there is not enough wealth even in this rich country to make everybody comfortable. Nevertheless, as Professor Bowley has shown, the total income of Great Britain in 1913 divided equally among the population would have yielded only £154 for an average family, or about £260 at the present value of money. In order substantially to improve the conditions of life in this country, therefore, it is absolutely necessary to increase the productivity of labour. Indeed, one may go further and say that, in view of the increasing competition of countries with

greater natural resources, it is necessary to increase productivity in order to *maintain* the standard of life represented by Professor Bowley's figures. There is reason to believe that much could be achieved in this direction if labour would co-operate whole-heartedly in industry. The economist will therefore look very sympathetically at all schemes which are designed to encourage that spirit of co-operation, either by increasing the share of the product which goes to the workman, or by associating him more closely in the management of industry. For a discussion of the ways in which the present industrial system may be modified, the reader is referred to another volume in this series. Here it is only necessary to add that co-operation will not be promoted by raising hopes of a standard of comfort which cannot be reached.

We are living to-day in a world of men who can only maintain themselves by the most intricate system of co-operation between individuals, classes, nations and races. Yet the dominant note is one of conflict. Every few years the fittest members of the community are selected to be taken away from their wives in the prime of life ; a large proportion of them are killed, and many of the survivors are permanently reduced to a lower standard of health. Meanwhile the intercourse between nations is interrupted, and the relations between the classes in each community are embittered by the consequences of war.

In internal affairs, practical men, whether they call themselves eugenists, or socialists, or "average sensual men," are bound to recognize that, in this country at any rate, we are committed for many years to come to

an industrial civilization and a more or less democratic form of government. Freedom of choice is therefore narrowed down to an attempt to preserve and accentuate the present distinctions of class and wealth, or an attempt, within the limits of restricted material resources, to improve the social environment of the working classes. The former policy would be designed to maintain an aristocracy of birth (in which the middle classes are now generally included) in a position from which they could impose their will upon their social and, it is assumed, their racial inferiors, to the benefit of all concerned. The latter policy would be designed to develop the latent qualities of mind and body and character which lie obscured by poverty, and to permit an educated democracy to select and control its own rulers. It would be absurd, however, to suggest that the alternatives are likely to be considered on their merits from a racial standpoint. The dominant consideration with most people is, and perhaps ought to be, the sense that there is something wrong with a community in which extreme wealth and extreme poverty exist side by side, and that everybody who is brought into the world ought to be given a fair chance to develop into a satisfactory human being. The main contribution which economics can make at present in this discussion is to point out that this aspiration can only be realized if the national output of wealth increases more rapidly than the population.

CHAPTER IX

SUMMARY AND CONCLUSION

"But a multitude of wise men is salvation to the world; and an understanding king is tranquillity to his people."

Wisdom vi. 24.

§ 1. *Recapitulatory.* It is not the purpose of this handbook to arrive at definite conclusions on population problems, or to advocate the adoption of any particular course of action. Its purpose is to indicate the nature of those problems and to point out some of the factors which must be taken into account if a sound opinion is to be formed on the subject. It may be useful, therefore, to give here a brief summary of the general situation outlined in the foregoing chapters.

"Through the animal and vegetable kingdoms," as Malthus said, "Nature has scattered the seeds of life abroad with the most profuse and liberal hand; but has been comparatively sparing in the room and the nourishment necessary to rear them." Thus all plants and animals have a tendency to increase beyond the means which nature provides for their subsistence, and only a small proportion of young plants and animals can grow to maturity. Man was completely subject to the same law, until he learned to increase the supply of human food yielded by nature, through the

cultivation of plants and animals specially adapted to his needs. Even then he was only freed to a small extent from the general restrictive rule, for all his efforts could not produce enough food to provide for more than an infinitesimal part of the children that could be born. Finding that the tortoise could not overtake the hare, primitive man seems to have done his best to persuade the hare to go to sleep, for everywhere among primitive peoples one at least of three devices for the limitation of numbers—abortion, infanticide, or prolonged abstention from intercourse—has been found to prevail. One of these checks to population, that of infanticide, probably had an eugenic influence, for it would naturally be the weakly children who were first sacrificed; and the natural check of privation may have had a similar tendency to select the least fit for destruction. The progress of civilization has enabled man to exercise a constantly increasing control over nature, and to wring a larger and larger supply of food from the earth, but never, probably, until the middle of the nineteenth century, has human subsistence been brought within measurable distance of the reproductive power of the race. At that period, the rapid development of immense natural resources in North America, rendered possible by the no less rapid development in Europe, and especially in Great Britain, of coal and iron and the manufactures dependent upon them, gave to the white races of Western Europe the extraordinary experience of a supply of things for human consumption increasing even more rapidly than the population could do with an almost unrestricted birth-rate. Increasing returns to every dose of capital

and labour applied either to agriculture in the New World or to manufacturing in the Old were, for a time, obtained. The standard of living rose; the cost of living continued to fall, and man's conquest over nature seemed wellnigh complete. Then, it was that, in spite of the warning voices of Mill and Jevons, the progress of the human race towards material and spiritual perfection was generally in Western Europe believed to be continuous and inevitable. Malthus, with his Principle of Population, and Ricardo, with his Law of Diminishing Returns, were discredited.

§ 2. *A Forecast by Malthus.* There is a curious passage in Malthus's Essay which might have given the optimists cause for thought. It has not been quoted in the earlier chapters of this handbook, and the reader who has grasped the situation sketched therein will appreciate the significance of this forecast:

"In the wildness of speculation," wrote Malthus, "it has been suggested (of course more in jest than in earnest) that Europe ought to grow its corn in America, and devote itself solely to manufactures and commerce, as the best sort of division of the labour of the globe. But even on the extravagant supposition that the natural course of things might lead to such a division of labour for a time, and that by such means Europe could raise a population greater than its lands could possibly support, the consequences ought justly to be dreaded. It is an unquestionable truth that it must answer to every territorial state, in its natural progress to wealth, to manufacture for itself, unless the countries from which it had purchased its manufactures possess some advantages peculiar to them besides capital and skill. But when upon this principle America began to withdraw its corn from Europe and the agricultural exertions

of Europe were inadequate to make up the deficiency, it would certainly be felt that the temporary advantages of a greater degree of wealth and population (supposing them to have been really attained) had been very dearly purchased by a long period of retrograde movements and misery."[1]

The division of labour between America and Europe was, of course, at no time so complete as in this "extravagant supposition." Before the war, Russia was responsible for a quarter of the world's export of wheat; France was self-supporting; Germany grew nearly 80 per cent of her own food and drew considerable supplies from her south-eastern neighbours. Nevertheless, the picture is near enough to the truth, especially as far as Great Britain is concerned, to be disquieting. Europe has certainly attained "a greater degree of wealth and population" through such a division of labour with America than she would otherwise have achieved; America has begun "to withdraw its corn from Europe," and it still remains to be seen whether "a long period of retrograde movements and misery" will be averted.

§ 3. *The World's Resources.* A survey of the world's resources is to some extent reassuring. An immense increase in the food supply through the intensive cultivation of vast areas in Canada, South America and Siberia is to be anticipated. Raw cotton may in time be rescued in America from its arch-enemy the boll weevil, and other sources of supply may be developed. Wool gives no immediate cause for anxiety. Coal and iron still exist in large quantities both in America and

[1] *Essay*, Book III, Chap. XII.

Europe; oil is an unknown quantity; water-power awaits development, and electrical power offers great economies in the use of fuel. The chief cause for anxiety lies in the changing ratio of exchange between the manufactures of Europe and the raw products of other countries. Therein lies the danger of a decline in the standard of life available for the masses of workers congregated in the industrial centres. Europe has suffered a catastrophic collapse through the war, and the danger is that the unseen and little heeded pressure of population upon natural resources may retard, or even prohibit, the recovery of pre-war prosperity.

§ 4. *The Way Out.* There are two ways in which mankind can meet the situation which threatens to arise. One is by increasing the productivity of labour; the other by restricting the birth-rate. Both measures appear to be necessary if the world is to be a tolerable place in the years to come. Both are unfortunately impeded by the failure of nations and classes to co-operate fully with one another for the common good. The international division of labour has enabled the present vast population to come into existence, but it is now being obstructed by measures dictated by national jealousies, while statesmen strive to increase still further the number of their citizens to serve the ends of war. Meanwhile, the classes within each state materially reduce the product of industry by quarrelling over its distribution; and the most tragic element in the position is that as the population becomes larger and the productivity of labour is reduced, the nations and classes have more real cause for strife.

In spite of the efforts of statesmen, however, the birth-rate is declining in all the countries of Western civilization, and there are reasons for thinking that the decline is mainly due to the deliberate limitation by married people of the size of their families. This fact gives rise to the hope that man may in time assume the conscious control of one of the greatest forces by which the richness or poverty, the happiness or misery, of his life on the earth is determined—the power of population. It is also held by some people to justify the further hope that, when the science of genetics reaches an advanced stage of development, some rational method of selecting the parents of future generations may be introduced. Positive eugenics is, however, a dream for the distant future; to some of us it is not even a pleasant dream; for the present the only practicable project advocated by responsible geneticists is the enforced celibacy of a small minority of the population who are demonstrably unfit for parenthood.

§ 5. *Possible Scientific Developments.* Having concluded this brief restatement of the population problem, as the present writer sees it, it may be well to anticipate two general criticisms. One such criticism is that no account has been taken of the possibility that science may show the way by which a sudden leap forward can be taken in the control of nature and the means of subsistence immeasurably increased. Professor Soddy, for instance, bids us, in eloquent and inspiring language, to look confidently for such a development.

"Until the twentieth century had entered its opening decade," he writes, "a thoughtful observer of the social consequences of science would have seen in the revolution cause for profound uneasiness. Here was no stable or enduring development, but rather the accelerating progress of the spendthrift to destruction, so soon as the inheritance had been squandered and the inevitable day of reckoning arrived. When coal and oil were exhausted, and the daily modicum of sunlight represented once again, as of yore, the whole precarious means of livelihood of the world, the new inanimate servant of science, like the slaves of the ancients, would prove a dangerous helpmate, and the mushroom civilization it had engendered would dissolve like the historic empires of the past, this time submerging the world.

". . . No one had guessed the original source of the stream of energy which rejuvenates the universe, nor that it has its rise, not in the unfathomable immensities of space, but in the individual atoms of matter all round. In so far as it is dominated by the supply of available energy, the limits of the possible expansion and development of the race in the future have been virtually abolished by this discovery of the immanence of the physical sources of life and motion in the universe.

"Painfully and with infinite slowness man has crawled to the elevation from which he can envisage his eventful past as a whole from one standpoint, as that of a struggle, still largely internecine rather than co-operative, for a miserably inadequate allowance of energy. He looks back across the gulf of time from the day of the nameless and forgotten savage, who first discovered the art of kindling a fire, to himself, his logical descendant, master of a world largely nourished by the energy of fuel, and humming with the music of inanimate machinery. . . . The main stream (of energy) sweeps past his doors, and the great gulf that yawns between him and the consummation of his emancipation looks small enough compared with the gulf that yawns behind.

". . . The energy is there, but the knowledge of how to liberate it at will and apply it to useful ends is not—not yet.

"The problem will be solved when we have learned how to transmute one kind of element into another at will, and not before. It may well take science many years, possibly even centuries, to learn how to do this, but already the quarry is in full view and, by numerous routes, investigators are starting off in hot pursuit. We need only recall the past history of the progress of science to be assured that, whether it takes years or centuries, artificial transmutation and the rendering available of a supply of energy as much beyond that of fuel as the latter is beyond brute energy will be eventually effected.

"It is unlikely, but not impossible, that such a discovery might be made almost at once. . . ."[1]

It has seemed worth while to quote at some length from Professor Soddy, because he admirably expresses a view which is widely held by others who cannot claim to share his scientific eminence. It will be seen that the Professor takes an extreme view of the precarious nature of the sources of energy upon which the industrial life of the world is at present based. In his opinion, however, all cause for anxiety on this score has been removed by the discovery of radium, which has revealed the fact that an inexhaustible supply of energy can be released from the atom by the transmutation of elements. Professor Soddy's almost religious faith that science will in time find out how to liberate this energy, at will, seems to a layman to be based on rather slender foundations.

Pure scepticism, however, could not be held to justify us in ignoring the possibility of a scientific development

[1] *Science and Life*, by Frederick Soddy, M.A., F.R.S., pp. 13, 14, 15, 35 and 36.

which would revolutionize the situation; for, even if Professor Soddy's forecast were proved to be unsound, there are other conceivable discoveries, such as those of synthetic chemistry, which ought to be examined. The solid ground for leaving all such speculations out of account is that they are all necessarily concerned with a vague future. The pessimist who anticipates a catastrophe to the human race five hundred years or one thousand years hence, must take into account these possibilities of science; but the foregoing chapters have been devoted to a consideration of immediate problems. Again and again it has been pointed out that the issue is not whether population will in course of time outrun the means of subsistence; not whether the coal-fields of Great Britain will eventually be exhausted; but whether the silent pressure of excessive numbers on the food supply is *now* being felt in the form of unemployment, rising prices and encroachments upon the standard of life in the industrial centres. To the patient scientist the difference between a few years and a few centuries is almost trivial; to the economist, time is all important. The factors discussed in this handbook may, if they are not modified, destroy Western civilization in a few years; it may be that they have already undermined its foundations. Perhaps the scientist can and will transform the situation. It is the business of economics to point out how and where the situation is at present menacing, and to call upon science for prompt assistance.

§ 6. *The Value of Discussion.* Another general criticism, which may be anticipated, is that it is useless

to point out evils in human society unless appropriate remedies such as can be embodied in Acts of Parliament, or some equally concrete form, are at the same time indicated. Jevons evidently had an uneasy sense of his vulnerability to this form of criticism when he wrote his alarming dissertation on *The Coal Question.* Feeling an imperative need for some concrete proposal "towards compensating posterity for our present lavish use of cheap coal," he found it in "the reduction or paying off of the National Debt." There is something both pathetic and humorous in the reflection that when Jevons made this "bold" suggestion, in 1864, the Debt amounted to £819,677,852. It is now about £8,000,000,000!

Generally speaking, population problems cannot be solved by the method of legislative enactment. Arising, as they do, through changes in the productivity of labour, on the one side, and changes in the number of human beings on the other, they lie at the root of some of the most pressing difficulties of social life. It is true that both productivity and fecundity may be profoundly modified by the laws and customs of human society; but the influence of laws and customs on these fundamental matters has hitherto been indirect and largely unrecognized. He would be a bold man who would suggest, for instance, the passing of a law for the limitation of the size of families!

The population problem which Malthus, Ricardo and John Stuart Mill first revealed to thoughtful people in this country remains unsolved; and it may indeed be expected to grow more acute unless its importance is widely recognized and its implications

are allowed to modify the habits of modern civilization as they appear to have modified those of primitive society. Man, "noble in reason," can only control the forces which determine the conditions of his life by understanding what they are and how they work. In the words of Huxley: "There is no alleviation to the sufferings of mankind except veracity of thought and of action, and the resolute facing of the world as it is when the garment of make-believe with which pious hands have hidden its uglier features has been stripped off."